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electron user

Vol. 3 No. 6 March 1986 £1

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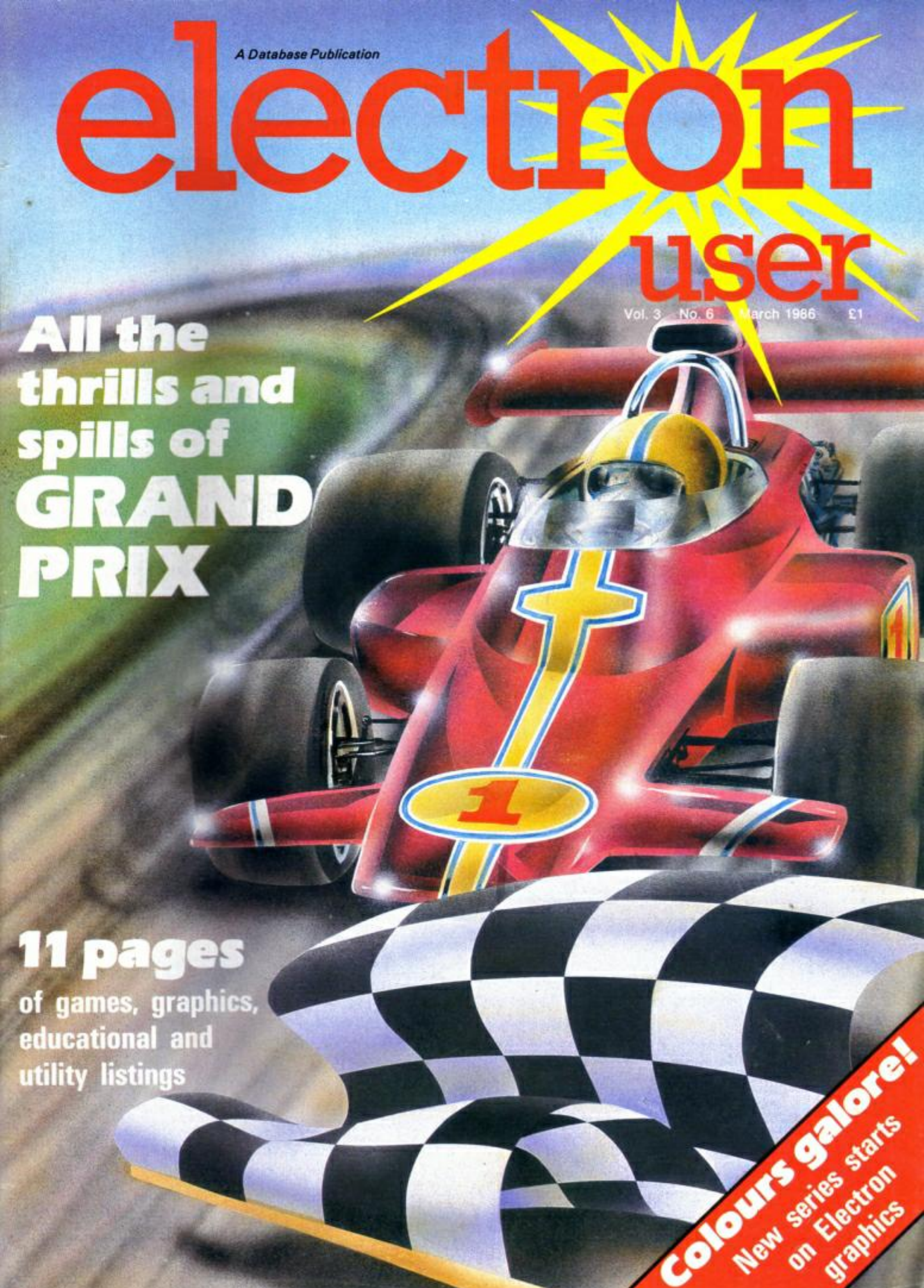

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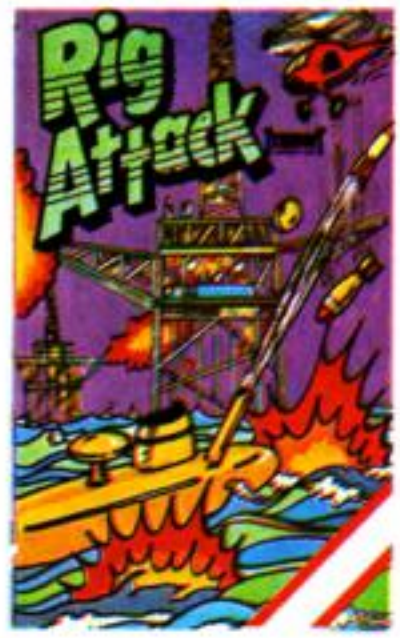

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The Daily Scoop

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electron user NEWS

Repton 2 collects award

STRATEGIC treasure hunt - cum - jigsaw puzzle Repton 2 from Superior Software – which is available for both the Electron and the BBC Micro – has won the title 1985 BBC Game of the Year.

The award was decided by a poll of readers of Computer Gamer magazine and presented at a ceremony held at the Regents Palace Hotel, London.

Repton 2, which features in a special subscription offer in this month's issue of *Electron User*, beat Revs from Acornsoft into second place in a close-run race.

Third was Knight Lore from Ultimate.

Disc book

A FREE 70-page handbook describing its disc drive operating system for the Electron has been published by Cumana.

The publication covers detailed technical information, all operating procedures and functions, from data storage through to fitting an additional ROM.

Electron owners can obtain a copy by writing to Cumana Limited, Pines Trading Estate, Broad Street, Guildford, Surrey GU3 3BH.

Interface opens up software range for Electron

A DRAMATIC breakthrough on the Electron front has opened up the machine to "a vast pool" of disc based software currently restricted to the BBC Micro range.

In all several hundred titles are involved, including many of the leading educational programs available in the UK.

All this is due to Advanced Computer Products going into production with an Electron disc interface. Known as the AP4, it will feature 1770DFS as standard running with page at E00.

Priced in the region of £70 – the price has still to be settled – the interface will allow the transfer of files between systems. This includes not only tape to disc but DFS to ADFS and vice versa.

"One of the main complaints from Electron users has always been the lack of good software around", says John Huddlestone of ACP. "Now the AP4 will change all that".

Advanced Computer Products also hopes to launch another major enhancement for the Electron on the heels of the AP4.

To be called the AP5 this combines a 1 MHz bus, user port providing the same I/O as the BBC Micro and a Tube interface.

The Tube will allow Acorn's second processor to be connected to the Electron, so providing a major boost in speed. It will also create additional memory – some 40k in Basic usable RAM and more than 60k machine code.

Meanwhile ACP has added another new product to its range to supplement the Advanced Disc Toolkit.

The Advanced ROM Manager gives user ability to handle ROMs in ROM filing system.

Priced at £20, it allows users to run their own software from sideways ROM

The mouse is coming!

THE new AP5 interface *(see main story)* will allow Electron users for the first time to enjoy the advantages of the critically acclaimed AMX Mouse.

Such was the success of the original mouse for the BBC Micro that it sold 10,000 units in the first nine months alone.

Now the opto mechanical device from Advanced Memory Systems will offer Electron users what its manufacturers describe as "an entirely new approach to computing that makes the keyboard seem almost old fashioned".

The AP5 will also allow the Electron to run AMX Art. This is a computer-aided drawing program utilising on-screen windows, icons, pull-down menus and pointers for producing professional standard drawings or mere doodles that can be saved and printed.

BATTLE OVER MEXICO

SOFTWARE publisher Malcolm Howard is fighting off an attempt to suppress his World Cup football management simulation for the Electron, Mexico '86.

Leading games manufacturer US Gold feels it has sole rights to the title due to a licensing deal with FIFA, the world football ruling body and organisers of the World Cup finals.

Solicitors for US Gold recently wrote to Howard's company, Qual-Soft, stating their objection to the mail order firm's use of the title.

But Qual-Soft has been marketing its Mexico '86 game for nine months, and Howard says he sees no reason to give up the title.

"The official FIFA logo with the words Mexico '86 has been registered but never published, so it is not in force according to our legal advisors", Howard told *Electron User*.

A COMBAT READY PHANTOM II WILL COST YOU £14M

"Well produced and technically good futuristic combat flight simulation featuring some of the best and smoothest 3D graphics I've come across on the Beeb." –
Computer Trade Weekly

RATED 8 OUT OF 10 FOR QUALITY, GRAPHICS, PLAYABILITY & VALUE!

More than 'just' a very fast full-flight Simulator 'Phantom Combat' offers the excitement and energy of 1500 mph air to air combat in high resolution 3D colour graphics. This 100%+ machine code package has been written by a military flight simulator software engineer together with the B.A. captain who wrote the best selling '747' simulator for Doctor Soft.

A SIMULATOR INSIDE A SIMULATOR

In one of the training modes (formation mode: FORM) it is **actually possible to fly the Phanton AND control the Enemy aircraft** which can be clearly seen flying in 3D outside your fully equipped cockpit. Alternatively, a friend can pilot the second (separate keys) while you attack.

THE ADVERSARY

Now, at last, enemy aircraft are NOT shown as arcade 'sprites', **they are computer drawn, navigated and 'flown' at a smooth 15 Frames per second**. The delta outlines reflect Soviet Mig 21 (Fishbed)/Su 15 (Flagon) performance. In combat mode (CBAT) they fight back, intelligent and dangerous.

INSIDE

Instrumentation is comprehensive with a wealth of clear and precise displays, **featuring both analogue and digital readouts**, eg speed in knots as shown on a dial AND digitally, with a separate Mach number display; radar computed target range altitude and bearing shown; target pointer and gunsight; military 'Tacan' navigation (Tactical air navigation) etc.

'OUTSIDE'

External views includes Horizon, other aircraft, a network of ground detail points, **separate landing runways and animated 'strobe' approach lighting**. NO 'chunky' pixels, all objects are drawn in fine, high resolution coloured lines. **The view is recomputed and redrawn 15 times every second.**

AIR TO AIR COMBAT

Warning There are no 'lives' but your single one, your score is zeroed and the program restarted if you are shot down or crash. This motivates you to try and 'bring home' a damaged aircraft. May different forms of damage can occur. Most are survivable, eg a gear up runway landing if smooth enough. **If you can't land, use the EJECTION seat and survive.**

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BBC 32K ELECTRON versions

EU3

Electron takes over parish paperwork

MINISTERING unaided to a parish of about 15,000 people near Mansfield, Nottinghamshire, makes every day a busy one for the Rev Robin Walford.

But he has been able to cut the job down to manageable size since he bought an Electron 18 months ago.

Like his colleague down the road in Nottingham, the Rev Leslie Cowley, whose story was carried in last month's *Electron User*, he finds a computer takes a lot of the strain out of parish paperwork.

Priest-in-charge of St Alban the Martyr in the mining community of Forest Town, Mr Walford's conversion to serious computing with the Electron has been a gradual process.

He said: "I discovered the Electron shortly after I arrived in the parish and bought it with the intention of playing games and with some vague ideas of using it for administration.

"The games quickly palled, but my Electron didn't, and I have gradually developed my usage as well as the equipment over the time.

"In order to cope single handed with my workload I'm required to be very efficient in my administration and ministry, and my Electron plays a big part in this.

"My use of the machine falls into two main areas, word processing and database.

"My use of View is continually growing and what a blessing it is.

"All my correspondence is produced this way and I store on disc all of the standard forms for baptism and marriage, banns certificates, deeds of covenant, and application for permission to videotape wedding services.

Rev Robin's Electron takes the strain

"I use macro letters to write to, say, all the users of the church hall about some matter, in conjunction with the database to write to bereaved relatives on the anniversary of the death of their loved one, and to send encouraging notes to church members who have fallen by the wayside.

"I also store and reproduce various handouts which I use for courses I run and produce the various rotas for church duties.

"On my database I keep the church electoral roll, bereavement contacts, baptism contacts and names and addresses of those who covenant to our church.

"I have not yet got round to using Viewsheet, but have in mind its application in budgeting, balance sheets and covenants.

"My use of the Electron continually grows".

LEARNING MATHS THE HAPPY WAY

HAVING fun and learning maths aren't incompatible activities any more thanks to a suite of programs produced by ISMEC – the Independent Schools Microelectronics Program – for the Electron.

Number Games is aimed at primary school pupils and consists of six programs which explain and teach basic maths by providing simple and enjoyable games for children to play.

Boxes, Number Knight, Ladder, Little Blokes, Nimble Knight and Light Up are designed to please the eye and stimulate the youngsters' minds.

For example, in Little Blokes the user is introduced to adding by moving a figure around a grid system, a process that involves calculating a series of moves.

Price of the cassette, which is transferable to disc and Econet compatible, is £9.95.

One for snooker fans

THE game Electron-owning snooker fans have been waiting for has been released by software house CDS.

Steve Davis Snooker comes with computer play options giving demonstration games and has two particularly novel features.

It is the only snooker game which gives the user the option of making a player who produces a foul shot resulting in a snooker go again.

And clearly visible on the screen is the score in the current break and the colour selected by the player at table, allowing the game to be left for a period and resumed when convenient.

There are a number of skill levels, three table speeds, and a large range of power settings make for precise cue control.

You can choose from one player, two players and even no player games. If you ask Steve to play you get a demonstration game which allows you to study his technique and improve your play.

Steve Davis Snooker costs £8.95 on cassette and £12.95 on disc.

Aussies like our cricket

RETURNING to its originators like a boomerang is Australian best seller Arnies Armchair Cricket.

North East software house Tynesoft bought the rights to convert the game for the Electron and retitled it Ian Botham's Test Match.

But the Australians – who did not have their own Electron version – liked the conversion so much they bought the rights to sell it back Down Under.

Tynesoft's version of the cricket simulation game is now on sale in the UK, price £9.95. It is one of its three new releases.

The game has a choice of one or two players and selected number of overs, one day or test match. The user also has a choice of players, their strengths, positions and speed of play or can ask the computer to preselect them.

An Electron conversion of the classic arcade games Jet Set Willy and Rig Attack, are the company's other two releases. They cost £7.95 and £5.95 respectively.

More from Ribbon

BUDGET software specialist Blue Ribbon has added two new programs for the Electron to its range.

The first, Astro Plumber, has the user flying around the screen trying to seal leaks before either the air supply runs out or he is captured by cavern dwellers.

In the second – Diamond Mine II – the user is sent scurrying underground to collect as many of the precious stones as possible.

Both games cost £2.50 on cassette.

Now you can link your Electron to the telephone, here's how to make the most of your new hobby!

TeleLink

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Special supplement: Guide to Microcomputing on Prestel. Contains hundreds of page numbers covering games, education and business and utility programs for the BBC, Apple, Commodore and Spectrum. Plus hints, tips and reviews of comms products.

No. 2

Special supplement: Guide to Communicating with your Micro. All you want to know about user-to-user communications, protocols, how modems work, an introduction to networking and PSS. Plus a guide to 39 modems listing all their special features.

No. 3

Special supplement: Guide to Bulletin Boards in the UK. An in-depth survey of what bulletin boards offer and what they cost, how to access them, interviews with 12 leading sysops. Plus a complete listing of 39 bulletin boards, pinpointed on a map of the UK.

No. 4

Includes the first Teletext & Viewdata News, highlighting all the latest industrial news. Plus features on financial, legal and educational databases, start of a guide to Knowledge Index, how to work out your phone bill and a survey on portable micros with comms facilities.

No. 5

Special supplement: Guide to Communications Software. A survey of 37 communications software packages for 11 of the most popular micros. Plus advice on viewdata graphics, description of the de facto standard for UK bulletin boards, Xmodem, and online humour from Punch editor Alan Coren.

No. 6

Special supplement: Guide to teletext page design. A leading expert tells how to achieve eye-catching viewdata graphics. Plus all about coin-operated Prestel, setting up educational viewdata systems, using packet radio to cut phone bills, on-line credit reporting.

No. 7

Special supplement: Guide to using electronic mail. A detailed expert introduction to electronic mail's time-saving and cost-cutting features. Plus a challenge to Prestel's monopoly, launch of the BBC's Datacast, interview with a top US hacker, and how Farmlink is branching out.

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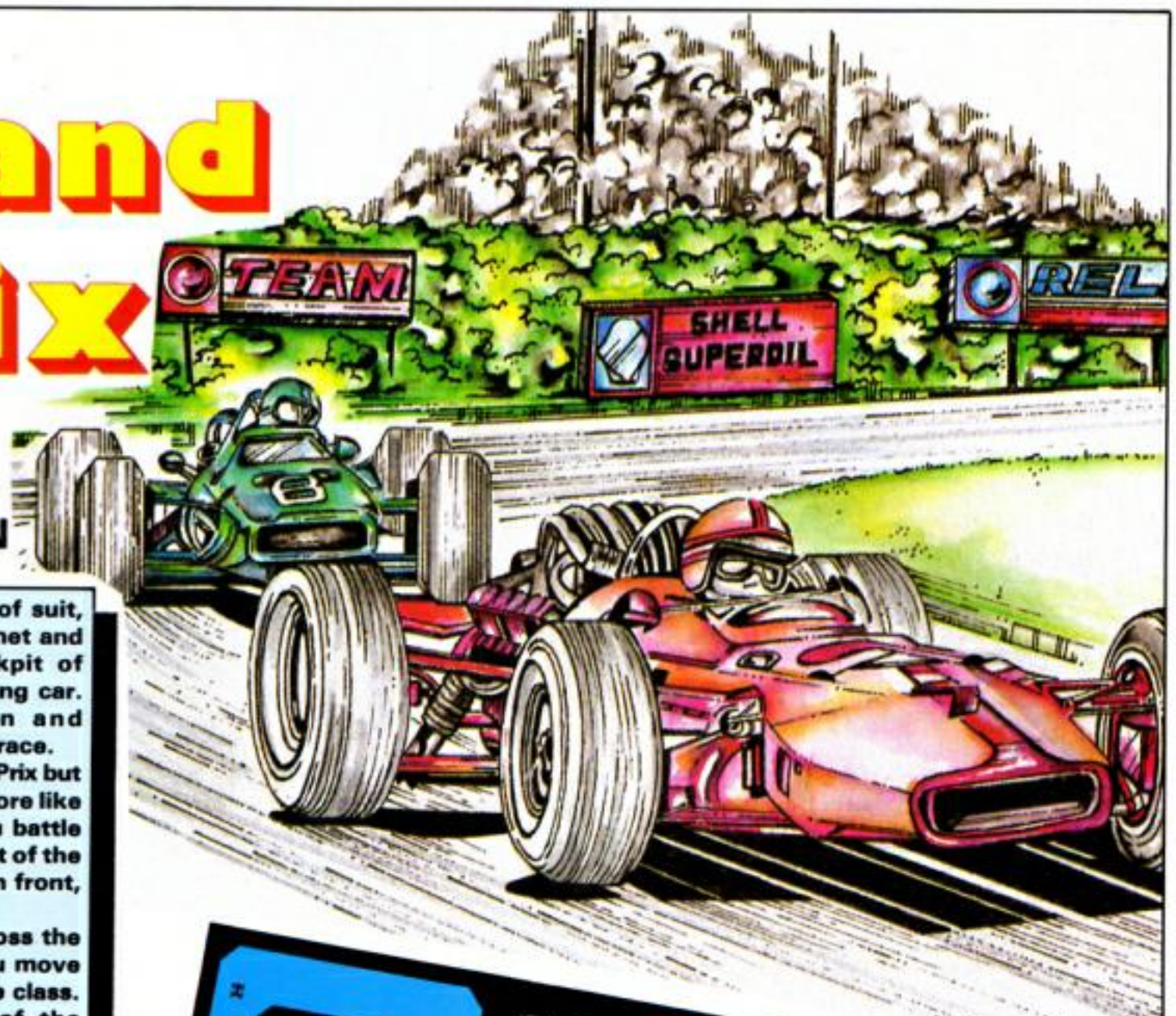
Grand Prix

By
STEPHEN
MERRIGAN



ZIP up your fireproof suit, don your crash helmet and slide into the cockpit of your grand prix racing car. Strap yourself in and prepare for the big race.

It may be a Grand Prix but at times it'll seem more like the dodgems as you battle your way to the front of the pack. Once you're in front, hang on.

If you're first across the line at the finish you move up into the next race class.

There the skill of the competitors increases to match your own so there's always a challenge. You won't find these drivers so easy to beat.

The keys are < to turn anticlockwise and > to turn clockwise. There isn't an accelerator or brake – it's an automatic, you go flat out all the time.

VARIABLES

B%()	Stores the track.
A%()	Cars' directions.
Q%,W%	Your car's coordinates.
q%,w% a%,s% d%,f%	The other cars' coordinates.

PROCEDURES

var	Sets the variables, defines the characters and envelopes.
draw	Draws the track.
car1 car2 car3	Moves the other cars.
raceover	Ends the race and moves you up to the next class if you've won.
ins	Prints the instructions.
move_man	Moves your car.

```
  10 REM Grand Prix
  20 REM By S.Merrigan
  30 REM (c) Electron User
  40 ON ERROR GOTO910
  50 MODE6:VDU23,1,0;0;0;0
;:CLS:PROCins
  60 MODE4:DIMA%(2,8):DIMG
%(4):DIMB%(39,31):PROCread
  70 PROCvar:ti%=5:X%=5:Z%
=5:PROCdraw
  80 PROCstarter
  90 REPEAT:PROCcar1:PROCc
ar2:PROCcar3:PROCmove_man
 100 TIME=0:REPEAT UNTIL T
IME>ti%:IF Q%=q% AND W%=w%
OR Q%=a% AND W%=s% OR Q%=d%
 AND W%=f% PROCdelay
 110 UNTIL G%(1)=X% OR G%(
4)=X%
 120 TIME=0:REPEAT UNTIL T
IME>200
 130 MODE4:PROCrace_pos
 140 IF G%(1)>G%(4) MODE4:
PROCbeaten:GOTO70
 150 MODE4:PROCraceover
 160 GOTO80
 170 DEF PROCrace_pos:VDU2
```

→

From Page 9

```
3,1,0;0;0;0;19,0,1;0;
  180 MOVE0,0:DRAW1279,0:DR
AW1279,1023:DRAW0,1023:DRAW
0,0
  190 MOVE476,916:DRAW796,9
16
  200 VDU5:MOVE480,950:PRIN
T;"GRAND PRIX":MOVE474,946:
GCOL0,0:PRINT;"GRAND PRIX":
VDU4
  210 PRINTTAB(0,5);"1st";T
AB(0,10);"2nd"
  220 IF GX(1)>GX(4) PRINTT
AB(16,5);"CAR 4";TAB(16,10)
;"BETWEEN CAR 1,2 & YOU"ELS
E PRINTTAB(16,5);"YOU";TAB(
16,10);"CAR 4"
  230 PRINTTAB(13,VPOS+5);"
PRESS SPACE":REPEAT UNTIL I
NKEY0=32
  240 ENDPROC
  250 DEF PROCdelay:FOR LX=
1 TO 5:TIME=0:REPEAT UNTIL
TIME>5:SOUND0,-15,5,1:SOUND
1,-15,LX*5,1:PROCcar1:PROCc
ar2:PROCcar3:VDU31,QX,WX,(2
29+DIRX):NEXT:ENDPROC
  260 DEF PROCvar
  270 VDU23,1,0;;PRINT'''':C
LS
  280 RESTORE520:FOR JX=1TO
8:READA,B:AX(1,JX)=A:AX(2,J
X)=B:NEXT
  290 VDU23,225,255,255,255
,255,255,255,255,255
  300 FORIX=220 TO 255:VDU2
3,IX,0,0,0,0,0,0,0,0:NEXT
  310 VDU23,226,255,127,63,
31,15,7,3,1;23,227,255,254,
252,248,240,224,192,128
  320 VDU23,228,1,3,7,15,31
,63,127,255;23,229,128,192,
224,240,248,252,254,255
  330 VDU23,230,0,119,34,12
6,126,34,119,0;23,231,10,31
,14,95,248,112,248,80
  340 VDU23,232,66,126,90,2
4,90,126,90,0;23,233,80,248
,112,250,95,14,31,10
  350 VDU23,234,0,238,68,12
6,126,68,238,0;23,235,10,31
,14,95,250,112,248,80
  360 VDU23,236,0,90,126,90
,24,90,126,66;23,237,80,248
,112,250,95,14,31,10
  370 VDU23,238,0,90,126,90
,24,90,126,90;23,225,255,25
5,255,255,255,255,255,255,255
  380 ENVELOPE1,1,-4,-2,-1,
1,5,-1,-1,0,0,0,0,0
  390 QX=22:WX=8:DIRX=5
  400 qX=22:wX=9:aX=22:sX=7
:dX=22:fX=6
  410 vX=1
  420 FOR I= 1 TO 4:GX(I)=0
:NEXT
  430 ENDPROC
  440  DEF PROCread:RESTORE
570:FOR rX=0 TO 26:FOR tX=0
 TO 39:READyX:BX(tX,rX)=yX:
NEXT,:ENDPROC
  450 DEF PROCmove_man:DIRX
=DIRX-INKEY(-103):IF DIRX>=
9 DIRX=1
  460 DIRX=DIRX+INKEY(-104)
:IF DIRX<=0 DIRX=8
  470 IF QX=22 AND WX<15:IF
 vX=1 GX(4)=GX(4)+1:PRINTTA
B(22,15);GX(4):vX=0
  480 IF QX=22 AND WX>15:vX
=1
  490 VDU31,QX,WX,32
  500 IF BX(QX+AX(2,DIRX),W
X+AX(1,DIRX))>0WX=WX+AX(1,D
IRX):QX=QX+AX(2,DIRX):ELSE
SOUND1,-15,50,1
  510 VDU31,QX,WX,(229+DIRX
):ENDPROC
  520 DATA0,-1,1,-1,1,0,1,1
,0,1,-1,1,-1,0,-1,-1
  530 DEF PROCdraw:VDU19,1,
RND(7);0;0;0
  540 FOR rX=0 TO 26:SOUND1
,-15,100+rX*2,1:FORtX=0 TO3
9 STEP2:VDU225-BX(tX,rX),22
5-BX(tX+1,rX):NEXT,
  550 PRINTTAB(14,11);"COMP
ETITORS";TAB(12,13);"1";TAB
(17,13);"2";TAB(22,13);"3";
TAB(27,13);"4";TAB(28,2);XX
;" Lap";TAB(21,4);"Race";TA
B(5,15);"Laps"
  560 ENDPROC
  570 DATA0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,-2,5,5,5,5,5,5,5
,5,5,5,5,5,5,5,4,-1,0,0,0,0
,0,0,0,0,0,0,-2,5,5,5,5,5,5
,5,5,4,-1,0
  580 DATA0,6,5,5,5,5,5,5,5
,5,5,5,5,5,5,5,3,3,0,0,0,0,
0,0,0,0,0,0,0,6,5,5,5,5,5,5
,5,3,3,0,0,7,7,5,5,5,5,5,5,
5,5,5,5,5,5,5,5,5,5,5,5,5,5
,5,5,5,5,5,5,5,3,3,3,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0
  590 DATA0,7,7,7,-3,0,0,0,
0,0,0,0,0,0,0,-4,3,11,3,0,0,0
,0,0,0,0,0,0,0,0,7,7,7,-3,0,0
,-4,3,3,3,3,0,0,0,7,7,7,0,0,0
,0,0,0,0,0,0,0,0,0,3,3,3,-1,0
,0,0,0,0,0,0,0,0,-2,7,7,7,0,0
,0,0,3,3,3,3,0
  600 DATA0,7,7,7,0,0,0,0,0
,0,0,0,0,0,0,3,3,5,5,5,5,5,5,
9,5,5,5,5,5,5,7,7,7,0,0,0,0,3
,3,3,3,0,0,7,7,7,0,0,0,0,0,0,
0,0,0,0,0,0,0,3,5,5,5,5,5,5,5,9
,5,5,5,5,5,5,5,7,7,0,0,0,0,3,
3,3,3,0
  610 DATA0,6,7,7,0,0,0,0,0
,0,0,0,0,0,0,0,4,5,5,5,5,5,4,5,
9,5,5,4,5,5,5,5,5,7,0,0,0,0,3
,3,3,3,0,0,7,7,7,0,0,0,0,0,0,
0,0,0,0,0,0,0,-4,5,6,5,5,5,5,5,
9,6,5,5,5,5,5,6,5,-3,0,0,0,0,
3,3,3,3,0
  620 DATA0,7,7,7,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,4
,3,3,3,3,0,0,7,8,7,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,3,
3,3,3,0
  630 DATA0,7,7,7,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,3
,3,11,3,0,0,7,7,7,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,3
,3,3,3,0
  640 DATA0,7,7,7,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,3
,3,3,3,0,0,7,7,7,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,3,
3,3,3,0
  650 DATA0,7,7,7,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,3
,3,3,3,0,0,7,7,7,0,0,0,0,0,
0,0,0,0,-2,2,1,1,1,1,1,1,1,
-1,0,0,0,0,0,0,0,0,0,0,0,0,0,
3,3,3,3,0
  660 DATA0,7,7,7,0,0,0,0,0
,0,0,0,0,3,3,1,1,1,1,1,1,1,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,3
,2,3,3,0,0,7,7,7,0,0,0,0,0,
0,0,0,0,3,3,3,1,1,1,1,1,7,7
,0,0,0,0,0,0,0,0,0,0,0,0,0,3,
3,3,3,0
  670 DATA0,7,7,7,0,0,0,0,0
,0,0,0,0,3,11,3,-3,0,0,-4,7
,7,7,0,0,0,0,0,0,0,0,0,0,0,0,
0,3,3,3,3,0,0,7,7,7,-1,0,0,
0,0,0,0,0,-2,3,3,3,0,0,0,0,
7,7,7,0,0,0,0,0,0,0,0,0,0,0
,0,3,3,3,3,0
  680 DATA0,7,7,7,1,1,1,1,1
,1,1,1,1,1,3,3,0,0,0,0,7,7,
7,-1,0,0,0,0,0,0,0,0,0,0,-2
,3,3,3,3,0,0,7,7,1,1,1,1,1,
1,1,1,1,1,1,1,3,0,0,0,0,7,7
,7,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,3,3,0
  690 DATA0,7,7,7,1,1,1,1,1
,1,1,1,1,1,1,2,0,0,0,0,7,7,
1,1,1,1,1,1,2,1,1,1,1,1,1,1
,1,1,2,0,0,-4,8,1,1,1,1,1,1
,1,1,1,1,1,1,-3,0,0,0,0,-4,
8,1,1,1,8,1,1,1,1,8,1,1,1,1
,1,1,1,-3,0
  700 DATA0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0
  710 DEF PROCcar1:cX=BX(qX
,wX):IF cX=9 GX(1)=GX(1)+1:
cX=5:PRINTTAB(27,15);GX(1)
  720 VDU31,qX,wX,32:qX=qX+
AX(2,cX):wX=wX+AX(1,cX):VDU
31,qX,wX,229+cX:ENDPROC
  730 DEF PROCcar2:IF RND(3
0)=1 ENDPROC
  740 cX=BX(aX,sX):IF cX=9
GX(2)=GX(2)+1:cX=5:PRINTTAB
(17,15);GX(2)
  750 IFcX=11 cX=RND(2)+2
  760 VDU31,aX,sX,32:aX=aX+
AX(2,cX):sX=sX+AX(1,cX):VDU
31,aX,sX,229+cX:ENDPROC
  770 DEF PROCcar3:cX=BX(dX
,fX):IF cX=9 GX(3)=GX(3)+1:
cX=5:PRINTTAB(12,15);GX(3)
  780 IFcX=11 cX=RND(2)+2
  790 VDU31,dX,fX,32:dX=dX+
AX(2,cX):fX=fX+AX(1,cX):VDU
31,dX,fX,229+cX:ENDPROC
  800 DEF PROCT:TIME=0:REPE
AT UNTIL TIME>3:ENDPROC
  810 DEF PROCraceover
  820 VDU23,1,0;0;0;0;:*FX1
5
  830 tiX=tiX-1:IF tiX<0 ti
X=0
  840 XX=XX+RND(2):IF XX>10
XX=10
  850 ZX=ZX+1:IF XX=10 XX=X
```

```
%-RND(3)
  860 PRINTTAB(0,0);"You Ha
ve been promoted to FORMULA
 ";ti%+1'"racing.";TAB(0,2)
;
  870 FOR I=29 TO1STEP-1:PR
OCT:VDU11:SOUND0,1,30,1:SOU
ND1,-15,I*3,1:NEXT:SOUND1,1
,30,10
  880 PRINTTAB(15,31);"PRES
S SPACE":FOR I=1TO15:PROCT:
VDU10:SOUND0,1,30,1:SOUND1,
-15,I*3,1:NEXT
  890 REPEAT UNTIL INKEY0=3
2
  900 PROCvar:PROCdraw:ENDP
ROC
  910 MODE6:VDU7:REPORT:PRI
NT;" at line ";ERL:END
  920 DEF PROCbeaten
  930 PRINTTAB(0,0);"We are
 sorry to inform you that y
ou"'"have not qualified for
 formula ";ti%+1;'"racing."
  940 FOR I=30TO1STEP-1:PRO
CT:VDU11:SOUND0,1,30,1:SOUN
D1,-15,I*3,1:NEXT:SOUND1,1,
30,10
  950 PRINTTAB(15,31);"PRES
S SPACE":FOR I=1TO15:PROCT:
VDU10:SOUND0,1,30,1:SOUND1,
-15,I*3,1:NEXT
  960 REPEAT UNTIL GET$=" "
  970 ENDPROC
  980 DEF PROCstarter
  990 SOUND1,1,200,0:PRINTT
AB(20,6);"READY":K=INKEY(50
):SOUND1,1,150,0
 1000 PRINTTAB(20,6);"STEAD
Y":K=INKEY(50):SOUND1,1,100
,6
 1010 PRINTTAB(20,6);"  GO
 ":K=INKEY(50):SOUND1,1,50,
4:K=INKEY(60)
 1020 ENDPROC
 1030 DEF PROCins:PRINT:VDU
19,1,0;0;0;0;
 1040 A$="  PRESS  ":B$="
SPACE  ":I%=0
 1050 PRINTSPC(14);"INSTRUC
TIONS"'SPC(14);"************
**
 1060 PRINT" You are a form
ula  six racing driver"'"st
riving  to  improve  to bec
ome  a"'"formula  1 driver.
"
 1070 PRINT"On the grid you
 are car number three"'"wat
ch out for car 4 as he is u
sually"'"the ace driver in
the race."
 1080 PRINT"If you win a ra
ce you get promotion."'"On
 losing  a  race you are re
turned"'"to formula  six."
 1090 PRINT" Crashing into
other cars causes you"'"to
have to wait for a short sp
ell to"'"have your car repa
ired."
 1100  PRINT'SPC(13);"Your
Keys Are"''SPC(7);"< - revo
lve clockwise"'SPC(7);"< -
revolve anti-clockwise"
 1110 VDU20:COLOUR0:COLOUR1
29
 1120 REPEAT:I%=I%+1:IF I%=
10 I%=0
 1130 TIME=0:REPEAT UNTIL T
IME>10
 1140 IF I%=2 SOUND1,1,50,0
:TIME=0:REPEAT UNTIL TIME>0
0
 1150 SOUND1,1,I%*RND(3),1
 1160 PRINTTAB(21,22);RIGHT
$(B$,9-I%);LEFT$(B$,I%)
 1170 PRINTTAB(12,22);RIGHT
$(A$,I%);LEFT$(A$,9-I%)
 1180 UNTIL INKEY0=32
 1190 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES

EPIC ADVENTURES

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Electron User October 1985.

The Wheel of Fortune

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The Wheel of Fortune has many additional features including an advanced command interpreter which accepts multi-statement sentences and also allows you to talk to the intelligent characters in the game.

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THE KINGDOM OF KLEIN: The Wicked Witch of the Mountain has stolen the magic Klein Bottle from the palace. She has sworn to put a hideous curse on whoever tries to recover it. Can you discover the mystical properties of the Bottle and destroy the witch? Can you then escape from her domain alive?

ORDER FORM

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The Quest for the Holy Grail	£6.95		
The Kingdom of Klein	£6.95		

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MicroLink
in association with
TELECOM GOLD

No. 7 March 1986

NEWSLETTER

WORD WINGS DOWN FROM WICK

CAITHNESS Glass, the company that made the Mastermind presentation bowl and many other famous engraved glass trophies, is using MicroLink for a pilot project which may eventually lead to a network linking it with its UK sales reps, agents and concession shops.

Famous all over the world for its collectors' paperweights and glass-and-silver jewellery, the firm has a greater need than most for reliable, high speed communications.

Situated in Wick, just about as far north as you can get in mainland Scotland, the company has factories in Perth and Oban, its sales office in Stoke-on-Trent, and reps, agents and retail outlets all over the UK.

"Considering the shortcomings of the postal system it would be ideal for everyone to have their own mailbox on a closed MicroLink network to facilitate ordering, financial accounting and stock control", said accounts and systems manager Homer Lindsay.

"It might even be possible to open up a section for micro owners among the 11,000 people around the world who are registered collectors of our paperweights so they can go on-line for the latest news about our products".

The password is...

WHEN someone joins MicroLink they are issued with their personal mailbox number and a unique password.

This is usually a six letter word – six is the minimum number of letters the system will accept – and the subscriber is, of course, free to change the password as often as required.

Human nature being what it is, do subscribers often lose or forget their passwords?

Says system manager Colin Rogerson: "Not very often now that MicroLink is well established. But in the early days we averaged one such case a week.

"However the problem is easily overcome. After taking the most stringent steps to establish the subscriber's credentials we refer them to the original password they were allocated, which is kept on permanent file at MicroLink's head office, and reissue it to their mailbox.

"But it does point up the fact that subscribers should always be careful to keep a record of whatever password they are using at the moment – although not in too obvious a place – just in case they suffer a lapse of memory".

Hold that train...

THE train now standing at Platform 4 can be caught courtesy of MicroLink, making subscribers rail journeys simple to organise from home or office.

If they hold a Visa, Access, American Express or Travel Key credit card they can book British Rail tickets, seat and sleeper reservations using MicroLink's new telebooking service.

Seats can be reserved at an extra cost of £1 – or £2 on Pullman services – and the charge for sleeper accommodation is £15 a berth.

MicroLink even helps subscribers choose their trains by carrying constantly updated British Rail timetables, together with fares between London and 20 major cities throughout England, Scotland and Wales.

Log on to the Flying Pig

LONDON subscriber Adrian Mars is using MicroLink to operate what he claims is the world's cheapest, completely independent, professional computer consultancy service ever.

He's even calling his organisation Flying Pig Services as an indication that be believes just about anything is possible with the help of MicroLink.

Flying Pig will help both home and business micro users choose their hardware, peripherals and software and also solve technical problems.

For £5.40 clients receive via MicroLink one or more versions of a comprehensive questionnaire relating to their specific area of interest.

The completed form will be assessed by Flying Pig consultants who, says Mars, will promptly offer "an unbiased reply that could well save lots of money". The client is also entitled to 15 minutes consultancy over the phone.

LINK OVERCOMES HANDICAPS

MICROLINK has been chosen as the electronic medium for an innovative scheme to introduce disabled people to the world of telecomputing.

Over the next few months the Central Remedial Clinic in Dublin will operate a pilot project involving half a dozen or so people of normal intelligence but who have physical handicaps ranging from slight motor impairment to the inability to move or speak coherently.

The project is thought to be unique in that, as well as using MicroLink's electronic mail facility, it will also embrace speech synthesis and speech recognition technology in helping the disabled to communicate with the outside world.

Microelectronic resources manager Bob Allen said: "We hope that their increased ability to communicate will lead to fuller lives. I won't guarantee them a job, but at least it will give them a fighting chance in the marketplace".

Interestingly, the disabled people involved in the project aren't thrilled at the prospect of telecomputing from home.

"At first we took the traditional view that this would mean independence for them", said Allen, "but they told us it would remove the social dimension from their lives and tend to isolate them.

"So we have compromised and will arrange for them to attend centres where there is a human element combined with the working environment".

YOUR chance to join MicroLink – Page 39

Software Surgery

THE COLUMN THAT TAKES A LOOK INSIDE THE LATEST RELEASES

Having fun with the relatives

Kissin' Kousins
English Software Co.

THIS is a good old fashioned arcade game containing the two vital ingredients for success – it's addictive and it's fun.

The aim of the game seems to be to navigate the male cousin past all manner of hazards until he meets his female counterpart.

It all looks very simple. You move the little chap straight across the screen on a road, jumping him over the odd bush and post box.

The quality of the background graphics is so good that you may find your mind wandering from the task in hand.

Another problem is the severe shortage of time. You lose a life if you don't cross the screen quickly enough. Not only that, you are being bombed as well.

It won't be long before you manage screen 1 with confidence and can then tackle the moving caterpillars on screen 2. Success here leads you on to the bouncing kangaroos, and by shooting these defenceless beasts you can obtain bonus points.

By now the road has led to the wooded countryside, and you encounter bats and moving mushrooms. These are pretty taxing, and avoiding them requires a lot of practice.

Screen 6 brings you to some rather cute frogs, but also to a long, dissolving bridge. This one defeats me, so I don't know what happens next.

I have two criticisms. Firstly, a multi-screen game like this should give you the option of starting with any screen.

Secondly, the game lacks a high score table, merely keeping a record of the highest score.

Those points apart though, this is an entertaining family game. The graphics and the animation are of a superb standard and the sound is adequate.

An extra bonus is that the tape contains both BBC and Electron versions of the game. (Make sure you load the right one.)

Recommended for arcade addicts of all ages.

Rog Frost

Helpful Mr Men

Word Games with the Mr Men
Mirrorsoft

THIS follows in the same promising steps as the earlier Mr Men programs from Mirrorsoft. Now the number of little characters is reduced to four, but the graphics execution is greatly improved.

Mr Noisy's Word Game features Mr Funny and Mr Silly as well as Mr Noisy, and the intention of the series of activities is to practise opposites and comparatives.

Any of the nine activities can be selected from the menu, and these include options in which the child can conjure up on the screen any of the characters in any given dimensions, so a tall Mr Noisy can stand beside a wide Mr Silly.

The young children I tried this with obviously enjoyed these activities, yet a great amount of vocabulary was being used, orally and in reading and typing at the keyboard. There is a screen dump facility included.

My favourite program, and that of many of my fellow players, was Read with Mr Bounce.

Again there is a menu with just five choices and this time the intention is to encourage practice in reading through the repetition of a number of phrases.

All in all, a fine program with a very real educational purpose, yet an equally high enjoyment factor. I highly recommend it.

Phil Tayler

The first steps

Make Sam Smile
Garland Educational Software

THREE separate packages, Counting, Word Matching and Spelling are designed to help with the first steps in learning to read and count.

Each is divided into three or four sections with activities relating to the growing skills of the children using them. All have superb graphics and a most appealing format.

Number recognition, learning to count and an introduction to simple addition are all included in the activities of the first package, Counting.

As with the others in the series this program features Sam, a friendly little chap who's very sad, but easily pleased by getting the right answers to his questions.

There are four games in the counting program. The first two require you to match numerals with a number of objects. In Game 1 a random number of croaking frogs, wriggling worms, skipping girls or barking dogs is displayed. I've discovered 18 different shapes so far.

The numeral cycles through from 1 to 10. If the number matches then Return should be pressed, if not, the Spacebar should be used.

Game 2 is similar except the numeral stays constant but the number of objects cycles through from 1 to 10.

Games 3 and 4 display two sets of different objects, and

→

From Page 13

the total number has to be matched with the numeral. This activity is a simple introduction to the concept of counting.

It is most important that these programs are carefully introduced to a child by an adult. The various aspects of each game are not really apparent from the screen display and the child needs to be shown what to do.

Changing from one activity to another is achieved by pressing a function key but there is no prompt on the screen to tell you when to do that.

I turned to the Word Matching program next. It has been designed to encourage the child who's just beginning to read. Objects are displayed on the screen and they have to be matched with the correct word. Again, this program only requires the use of the Spacebar to reject a word, and Return to indicate the correct answer.

The character Sam enters the screen and draws an empty box and a familiar object with the word for the object above it.

In Game 1 words are placed randomly in the box until the correct match is obtained – the child is matching word to word.

Game 2 requires the child to remember an object word that is flashed on to the screen and match it correctly as the words are shown in turn.

Game 3 is the same but no dots are displayed after the object word leaves the screen. In all three, incorrect responses cause successive letters of the answer to appear.

The vocabulary is restricted but although the number of words is limited the quality of graphics is very high.

An interesting feature is a caterpillar that crawls along the bottom of the screen. Each correct response causes it to crawl a little further until it reaches a leaf, then a butterfly emerges and flutters back across the screen. That piece of graphics is a real credit to the program.

Finally I tried out the Spelling package. This could not be introduced to a child until the rudiments of word recognition have been mastered. The vocabulary is a subset of the Word Matching program and so forms a good follow up exercise.

However, spelling is a far higher level activity than the word matching exercises and care should be taken that the child is ready for this type of work.

John Woollard

It's a long slog to Hell

Stairway To Hell
Software Invasion

BY far the biggest game I've yet seen for the Electron, Stairway To Hell is basically a graphics action game. But it has been produced on such a scale that it takes on the aura of an adventure program.

It is actually four linked programs – the first three consist of four separate screens each, and the last of these three, making a total of 15 screens, each of which is nearly a game in itself.

The object is to guide your explorer on his journey to the centre of the Earth through the various hazards to the last screen – an audience with the Devil.

I haven't seen this final screen yet, but the preceding 14 constitute a bewildering variety of detailed graphics and excellent animation.

Each is a variation on a familiar theme – climbing over obstacles, up and down ladders, jumping holes or moving hazards and collecting objects for points.

Variation is the key word here, and I can't think of a possibility which has not been covered in some way in one or another of the locations.

Moving is by the usual keys (Z, X, * and ?) and Return for a jump. Each section of the game has some short instructions, informing you of the environments, how to score points and bonus marks, and what to look out for.

Part 1 takes you down into the subterranean world through mines, the pump room and the grotto, each with its own brand of hazard such as rock falls, trolleys and rats.

From here you move into the realms of ice and snow, which gradually thaws to become a sub-tropical forest with mutant plants.

The temperature rises still further in part three, where snakes abound in the jungle, crocodiles in the swamp, and mosquitos in the mangroves.

Should you survive the desert and the entrance to Hell, fire and brimstone are everywhere as your explorer avoids falling lava and jumps flaming pits.

I'd really love to know what the audience with the Devil is like! The instructions do have the strange observation "Is this your journey's end?", so perhaps Software Invasion are keeping something up their sleeves.

My favourite screen is the Grotto, featuring invisible tunnels which you can only enter when approaching from the correct direction. Walking happily along you suddenly find yourself on a different level!

Along the way the very skilful will have accumulated enough points and information to enable them to solve the final screen, and in doing so stand a chance of winning one of the prizes being offered – the first worth £750.

Sound, however, is only adequate but to be fair this is not surprising when you consider how much has been packed in.

Stairway To Hell has all the

Strategy on the lawn

Maniac Mower
Kansas

IF you fancy a peaceful job like mowing a lawn, then this program is designed to put you off. Mind you, the rewards are quite high, with more than £1,000 – in points – to be earned by the keen and careful operator.

Your garden is, presumably, right next to Taunton Cricket Ground with Ian Botham in full flow. Quite an amazing number of cricket balls join the elastic bands and other debris lying about.

Any contact with these harmless looking bits and pieces means a new mower is required and you've only got three. A further problem is that your mower gets ruined if you venture on to grass that's already cut!

The biggest danger to life and limb is the rival mower. This little beast is hell-bent on colliding with you, or on making you bump into the garden walls or one of the nasty objects. You can do the same and try to trap the maniac mower for additional points.

To complete the misery a karate expert is practising in the garden and he is very keen to give you the chop.

This game ought to be fun to play but it is too slow for real arcade action. There is a lot of strategy involved in keeping your mower going and trapping your rival, and the game is enjoyable at that level. But one bad feature is that the chosen colours are awful, producing moving diagonal lines on black and white or colour TVs. Needless to say, all is well if you have a monitor.

As seems to be usual with Kansas games the instructions are excellent and a model for other software houses to copy. A feature of the program which I like is that it is written in Basic and listable, which means you can modify it to your heart's content. I'd also recommend the game to BBC Micro owners where the speed of action is good.

Arcade addicts will unfortunately find this game a disappointment, but if you prefer a slow action strategy problem and enjoy tinkering with programs then why not consider Maniac Mower?

Rog Frost

hallmarks of a very classy production. If you enjoy this sort of game, you'll love this one, and like all good adventures it will take a lot of time and perseverance to complete.

One final point. This cassette is one of an increasing number with the Electron version on one side and the BBC Micro version on the other. The result is that many shops are now stocking Electron games where previously they only carried those for the BBC Micro. Manufacturers save on production costs as one tape is cheaper to produce than two, and of course more Electron programs in the shops means more tapes sold.

This has to be good for the industry in general and Electron users in particular, and I would like to see this practice adopted by all software houses whenever it is practical.

Nick Rhodes

Not much down the mine

Diamond Mine
Blue Ribbon Software

AT just £2.50, this program is aimed quite definitely at the "pocket money" market.

However the low cost is well matched by a low interest level, little originality and little in the way of addiction.

It's not that the program is particularly bad, but just that I cannot really find very much to get enthusiastic about.

Imagine a mine – which is essentially a vertical maze – and at the top is the beginning of a pipeline.

You must guide the pipeline down through the mine in search of diamonds. There are a number of rather cute bugs which have a disconcerting habit of eating the pipeline, and these must obviously be avoided using the usual Z,X,*,? combination of keys.

The walls of the mine must also be negotiated, or else a length of pipeline is lost.

Having said that, there is remarkably little to add. It is not a particularly easy game to play, although naturally success comes with practice.

Sadly, I found that boredom also set in, although the game might keep some younger players interested for a few hours.

The Electron has been around a long time now, and the level of much other software makes this particular program look rather poor in comparison.

Pat Hillery

Packin' a lot in

Mexico '86
Qualsoft

HAVING played a variety of football management simulations, I eagerly loaded the first of these twin cassettes, which deals with the qualifying stages.

Actually it also includes a couple of European friendlies and the South American tour, which give ample opportunity to review your strengths and weaknesses. It also gave me the ideal opportunity to do the same to Qualsoft's program.

In some respects I was a little disappointed, for I began at the easiest skill level where the results seemed just too random and often incredible.

The sound effects are not particularly exciting, but these can be turned off. The most disappointing aspect was when I actually managed to reach the final where England beat Italy, but there wasn't a cup in sight – merely a one word message of congratulations!

The graphics, however, do give the impression of a football match, with 22 little match men rushing up and down the pitch with great effort, although poor skill. This is, naturally, computer-controlled so you can just watch the action for a minute or so.

At the higher skill levels the whole idea becomes far more interesting, with the players' strengths and weaknesses taken into far greater account. Great skill is needed, as I found it very easy to lose many a critical game.

However when the England team does eventually qualify it is necessary to save the data on to a blank cassette, which can then be reloaded into the second part, that dealing with the finals in Mexico.

Once there a squad of 20 is selected from the players so far used. Yes, there is an option to add extra players, so you too can play for your country! The stages here are really very authentic, but when you've won the cup once I would strongly suggest that you try at a more competitive level in order to capture the real challenge the program offers.

Sadly, although the qualifying cassette can obviously be reused there is no save facility elsewhere, and the whole program is a bit monotonous at one sitting. Still, it is a credit to Qualsoft to see just how complex an idea can be programmed into the Electron.

Phil Tayler

All singing, all dancing science

The Mole Concept
BBC Soft

THIS package in the Secondary Science series breaks new ground by being in the format of "computer synchronised audio".

This means that a tape commentary – spoken by Fred Harris – is played while the software runs. The two are kept in step by the simple method of pressing a key when Fred tells you to.

The programs are disc based only. In fact the drive is kept very busy throughout the presentation which lasts about half an hour. During that time, you will be stunned by the beautiful graphics that your computer can produce, seemingly instantly.

The package aims to teach or reinforce the chemist's rather specialised concept of a mole. To him it is a unit of measurement, not a furry animal. This is achieved by tutorial sessions followed by questions.

When used with pupils aged 15 and 16 there seems to be a good balance between teaching and questioning and the novel presentation of the information encourages them to solve the problems.

If any pupil finds questions difficult then a worked answer is given on screen.

The topic is covered thoroughly during the presentation, with domestic and industrial applications brought in.

In fact, long after Fred Harris has finished talking you can still be carrying out titration simulations and working out the molarity of solutions.

The accompanying booklet implies that this software should be used by individual students. Many schools would not be able to afford the computer time for this, but in fact the software works well with groups of pupils.

However it is used, there can be little doubt that students on O level or CSE chemistry courses will benefit from this software.

These pupils enjoy the novel format, the interesting voice and a touch of humour, not to mention the really lovely graphics. The learning they achieve is almost a side issue, but in fact a lot of knowledge sinks in.

This is a program that chemistry teachers really should find time for. It is a positive aid for pupils in coming to terms with this difficult idea.

Rog Frost

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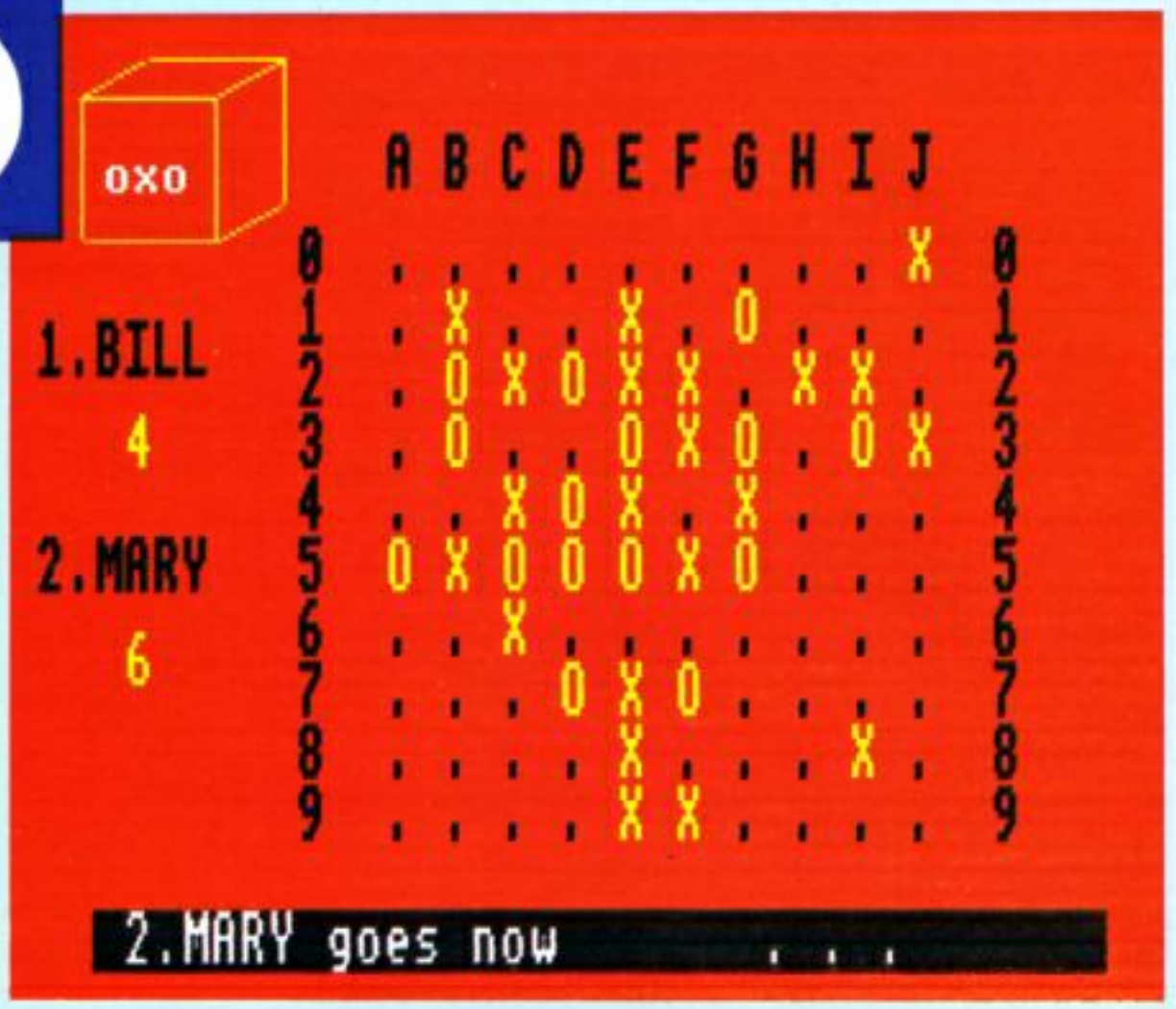
TO ORDER, PLEASE USE THE FORM ON PAGE 61

OXO

demands high strategy and low cunning



OXO is a game of strategy between two players. Each opponent takes it in turn to place either an X or an O on the 10 by 10 grid.

The object is to make as many combinations of the word OXO as possible.

The game ends when all the places are filled or when a player resigns.

The motivation I had for writing this program came from my class at school. All credit for the ideas, layout of the screen, design of the grid and colour combination must go to the pupils of 3R2 at Broom Field School.

The program can be loaded and run on an ordinary Electron.

However if it is to be used with a disc drive the value of PAGE must be lowered to &E00.

The program requires a lot of memory to store all the grid values and to accommodate the high resolution graphics mode. The ADFS reduces the micro's memory.

When you run the program the first prompt to be displayed is Sound? Tapping Y within 10 seconds will give full sound cues throughout the game.

The names of the two players are then entered. Only 11 characters are allowed for each name.

The prompt Auto start? then appears. If Y is pressed the Electron will randomly place up to 20 crosses on the grid at the start of the game.

We have found that this speeds up the start and makes it more interesting. It does not give the first player any advantage or disadvantage, but it does mean that a mistake in the early part of the game may be fatal.

The computer selects which player goes first and his or her name is displayed at the bottom of the screen.

A character is placed on the grid by typing the coordinate of the required position as a letter followed by a number.

The character X or O is then pressed. Delete can be used at any time if you make a mistake.

When you're sure that the entry is correct press Return.

The game continues until, after 100 moves, the grid is full. The winner is then declared.

It is possible to resign by pressing the Escape key.

This game has been written to a structured format to help with debugging and to allow changes to be made more easily.

Lines 10 to 490 contain the main sequence of events.

From this section of the listing all the procedures and functions are called. These are contained in lines 500 onward.

Full listing starts on Page 18

By JOHN WOOLLARD

PROCEDURES

autoplay	Puts randomly selected Xs on the grid at the start of autoplay.
cube	Draws a cube.
display	Draws grid, cube and scorepad.
endmessage	States the winner.
gamesetup	Clears grid before the start of play.
get(low%,high%)	Waits until a key is pressed in the range defined by the parameters. VDU7 if out-of-range key is pressed.
initiate	Dimension variables for such things as the grid, sets up double height routine, reads data.
input	A double height utility input.
oxo1, oxo2	Analyses grid for a winning combination of O-X-O.
play	Displays the prompt and receives player's move.
print(x%,y%,a$)	Prints a$ out at TAB(x%,y%) in double height.
printsetup	Contains the machine code assembly for the double height print routine.
score	Uses FNoxo1 and FNoxo2 to calculate score.
tune	Plays a five note sequence.

OXO listing

From Page 17

```
  10REM A game of strategy
  20REM By W.J.Woollard
  30REM Class 3R2
  40REM Broom Field School
  50REM Leigh Park, HAVANT
  60REM (c) Electron User
  70REM
  80gameword$="OXO"
  90*KEY10OLD|MRUN|M
 100MODE1
 110VDU23,1;0;0;0;0
 120COLOUR129:COLOUR2:CLS
 130PROCinitiate
 140PROCprint(10,7,"A game
of strategy")
 150COLOUR3:VDU19,3,11,0,0
,0
 160PROCcube(150,460,660)
 170COLOUR0
 180PROCprint(10,27,"Sound
?")
 190*FX15
 200*FX210,1
 210IFINKEY(999)=89THEN*FX
210
 220PROCtune
 230PROCprint(10,18,"Name
1: ")
 240names$(1)="1."+FNinput
 250PROCtune
 260PROCprint(10,21,"Name
2: ")
 270names$(2)="2."+FNinput
 280PROCtune
 290PROCgamesetup
 300PROCprint(10,27,"Auto
start ?")
 310auto%=0:IFINKEY(999)=8
9THENauto%=1
 320PROCdisplay
 330IFauto%THENPROCautopla
y
 340COLOUR1:COLOUR128
 350ONERRORPROCendmessage:
RUN
 360go%=0
 370player%=RND(2)
 380REPEAT
 390player%=player%MOD2+1
 400REPEAT
 410go%=go%+1
 420COLOUR3:COLOUR128
 430PROCplay
 440COLOUR2:COLOUR129
 450PROCscore
 460UNTILgo%=100ORscore%=0
 470UNTILgo%=100
 480PROCendmessage
 490RUN
 500DEFPROCautoplay
 510COLOUR2
 520FORk%=1TO20
 530l%=RND(10)+1:n%=RND(10
)+1
 540PROCprint(l%*2+8,n%*2+
3,CHR$s2%)
 550grid%(l%,n%)=s2%
 560NEXT
 570ENDPROC
 580DEFPROCcube(len%,xpos%
,ypos%)
 590MOVExpos%,ypos%
 600PLOT2,0,-len%:PLOT2,le
n%,0
 610PLOT2,0,len%:PLOT2,-le
n%,0
 620PLOT2,len%DIV2,len%DIV
4:PLOT2,len%,0
 630PLOT2,-len%DIV2,-len%D
IV4
 640PLOT0,len%DIV2,len%DIV
4
 650PLOT2,0,-len%:PLOT2,-l
en%DIV2,-len%DIV4
 660PLOT0,-len%+24,len%DIV
2
 670VDU5,79,88,79,4
 680ENDPROC
 690DEFPROCdisplay
 700LOCALc1%,c2%
 710CLS
 720PROCcube(150,80,935)
 730FORc1%=1TO10
 740PROCprint(c1%*2+10,4,C
HR$(64+c1%))
 750FORc2%=2TO11
 760PROCprint(c1%*2+10,c2%
*2+3,CHR$(grid%(c1%,c2%)))
 770NEXT
 780NEXT
 790FORc2%=1TO10
 800PROCprint(9,c2%*2+5,CH
R$(47+c2%))
 810PROCprint(33,c2%*2+5,C
HR$(47+c2%))
 820NEXT
```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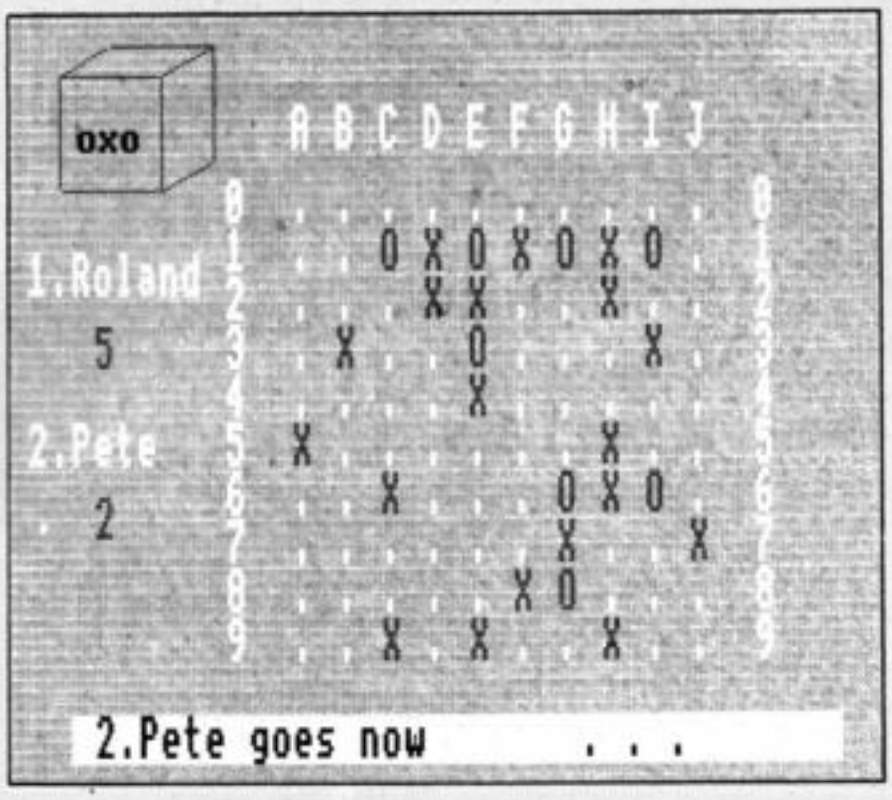


```
830names$(1)=LEFT$(names$
(1),8)
840names$(2)=LEFT$(names$
(2),8)
850PROCprint(0,10,names$(
1))
860PROCprint(0,17,names$(
2))
870ENDPROC
880DEFPROCendmessage:enda
essage$=STRING$(35," ")
890PROCtune
900COLOUR1
910PROCprint(0,29,endmess
age$)
920IFscore%(1)=score%(2)T
HENendmessage$="This is a d
raw !"
930IFscore%(1)>score%(2)T
HENendmessage$=names$(1)+"
is the winner !"
940IFscore%(1)<score%(2)T
HENendmessage$=names$(2)+"
is the winner !"
950PROCprint(0,29,endmess
age$)
960*FX21
970i%=INKEY(999)
980ENDPROC
990DEFPROCgamesetup
1000FORc1%=0TO13
1010FORc2%=0TO13
1020grid%(c1%,c2%)=46
1030NEXT:NEXT
1040score%(1)=0:score%(2)=
0
1050ENDPROC
1060DEFFNget(low%,high%)
1070LOCALget%
1080IFlow%>high%THENget%=l
ow%:low%=high%:high%=get%
1090REPEATget%=GET
1100IFget%<low%ORget%>high
%THENVDU7
1110UNTIL(get%)=low%)AND(g
et%(=high%)
1120=get%
1130DEFPROCinitiate
1140s1%=ASC(gameword$)
1150s2%=ASC(MID$(gameword$
,2))
1160PROCprintsetup
1170DIMgrid%(13,13),check%
(8,8)
1180DIMnames$(2),score%(2)
1190FORc1%=1TO8:READcheck%
(c1%,1),check%(c1%,2):NEXT
1200DATA-1,-1,0,-1,1,-1
1210DATA-1,0,1,0
1220DATA-1,1,0,1,1,1
1230ENDPROC
1240DEFFNinput
1250LOCALvpos%,hpos%,get%,
string$
1260vpos%=VPOS:hpos%=POS
1270get%=0:string$=""
1280REPEAT
1290IFget%THENstring$=stri
ng$+CHR$get%
1300PROCprint(hpos%,vpos%,
string$+" ")
1310get%=GET
1320IFget%=127THENstring$=
LEFT$(string$,LEN(string$)-
1):get%=0
1330UNTILget%=13ORLEN(stri
ng$)>10
1340IFstring$=""THENstring
$="*"
1350=string$
1360DEFFNoxo1
1370LOCALc1%
1380score%=0
1390FORc1%=1TO8
1400IFgrid%(1%+check%(c1%,
1),n%+check%(c1%,2))=s2%AND
grid%(1%+check%(c1%,1)*2,n%
+check%(c1%,2)*2)=s1%THENsc
ore%=score%+1
1410NEXT
1420=score%
1430DEFFNoxo2
1440LOCALc1%
1450score%=0
1460FORc1%=1TO4
1470IFgrid%(1%+check%(c1%,
1),n%+check%(c1%,2))=s1%AND
grid%(1%+check%(9-c1%,1),n%
+check%(9-c1%,2))=s1%THENsc
ore%=score%+1
1480NEXT
1490=score%
1500DEFPROCplay
1510*FX21
1520PROCprint(2,29,STRING$
(35," "))
1530PROCprint(3,29,names$(
player%)+" goes now")
1540REPEAT
1550REPEAT
1560PROCprint(25,29,". . .
")
1570letter%=FNget(65,75)
1580PROCprint(25,29,CHR$le
tter%)
1590number%=FNget(48,58)
1600PROCprint(27,29,CHR$nu
mber%)
1610REPEAT
1620symbol%=FNget(s1%,s2%)
1630UNTILsymbol%=s1%ORsymb
ol%=s2%
1640PROCprint(29,29,CHR$sy
mbol%)
1650l%=letter%-65:n%=numbe
r%-48
1660UNTILgrid%(l%,n%)=46
1670UNTILGET=13
1680ENDPROC
1690DEFPROCscore
1700score%=0
1710IFsymbol%=s1%THENscore
%=FNoxo1
1720IFsymbol%=s2%THENscore
%=FNoxo2
1730score%(player%)=score%
(player%)+score%
1740IFscore%>0THENPROCtune
1750grid%(l%,n%)=symbol%
1760PROCprint(3,13,STR$(sc
ore%(1)))
1770PROCprint(3,20,STR$(sc
ore%(2)))
1780PROCprint(l%*2+8,n%*2+
3,CHR$symbol%)
1790ENDPROC
1800DEFPROCprint(xtab%,yta
b%,word$)
1810IFword$=""THENENDPROC
1820REM PRINTTAB(xtab%,yta
b%);word$;:ENDPROC
1830LOCALc1%
1840FORc1%=1TOLEN(word$)
1850X%=xtab%+c1%:Y%=ytab%
1860A%=ASC(MID$(word$,c1%)
):CALLdblp
1870IFA%=32THENSOUND1,-15,
48+4*RND(8),1
1880NEXT
1890VDU11
1900ENDPROC
1910DEFPROCprintsetup
1920DIMdblp%FF:q=&FFEE
1930FORopt=0TO2STEP2
1940P%=dblp
1950[OPTopt
1960STA&70:STX&79:STY&7A
1970LDA#10:LDX#&70:LDY#0:J
SR&FFF1
1980LDA#23:JSR&FFEE:LDA#25
5:JSR&FFEE:LDA&71:JSR&FFEE:
JSR&FFEE:LDA&72:JSR&FFEE:JS
R&FFEE:LDA&73:JSR&FFEE:JSR&
FFEE:LDA&74:JSR&FFEE:JSR&FF
EE:LDA#31:JSR&FFEE:LDA&79:J
SR&FFEE:LDA&7A:JSR&FFEE:LDA
#255:JSR&FFEE
1990LDA#23:JSR&FFEE:LDA#25
5:JSR&FFEE:LDA&75:JSR&FFEE:
JSR&FFEE:LDA&76:JSR&FFEE:JS
R&FFEE:LDA&77:JSR&FFEE:JSR&
FFEE:LDA&78:JSR&FFEE:JSR&FF
EE:LDA#31:JSR&FFEE:LDA&79:J
SR&FFEE:LDA&7A:ADC#1:JSR&FF
EE:LDA#255:JSR&FFEE:RTS:]:N
EXT
2000ENDPROC
2010DEFPROCtune
2020SOUND1,-15,97,5
2030SOUND1,-15,105,5
2040SOUND1,-15,89,5
2050SOUND1,-15,41,5
2060SOUND1,-15,89,10
2070ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

It's all a question of trigonometry

PETE BIBBY turns to SIN, COS and PI

LAST month we took a look at some of the Basic functions available on the Electron.

First we touched briefly on the string handling functions we already knew and loved, examples being ASC and CHR$.

Then we went on to cover some of the functions used to handle numbers such as INT and SQR.

Finally we say how COUNT, POS and VPOS could be used in screen layouts.

This month we'll be looking at some more – the trigonometric functions such as SIN and COS that you may remember from school. We'll also be meeting a resident integer variable, @%.

But first we'll take a look at a constant, a number that never changes. Try entering:

```
PRINT PI
```

into your micro and pressing Return. Quick as a flash the Electron will hurl:

```
3.14159265
```

back at you.

Now this is strange behaviour, quite out of character for our normally fussy Electron. After all, we haven't assigned PI a value. Usually if we do something like:

```
PRINT A
```

without having first given it a value, the Electron comes up with:

```
No such variable
```

Well we haven't given PI a number, yet the micro accepts it in a PRINT command without so much as a murmur. What's going on?

The answer is that PI isn't a variable, it's a constant. That 3.14159265 – or 3.142 to its friends – is so useful a number that those awfully clever Acorn people have built it into the machine, available at the drop of a PI.

And PI stays at that value. You can't change it, as you'll find if you try:

```
LET PI=89
```

This PI is Pythagoras' Constant, that rather special number that mathematicians love. You've probably used it to find the area of a circle which is PI times the square of the radius.

It's an amazing number, turning up in all sorts of unexpected places in maths – but what is it doing inside the Electron?

Before we answer that let's have a look at two more functions, RAD and DEG, which deal with angles.

Again you'll probably remember about angles from school, with things like "the interior angles of a triangle add up to 180 degrees" and "an angle of 90 degrees is called a right angle" burnt into your memory. Figure I shows some examples.

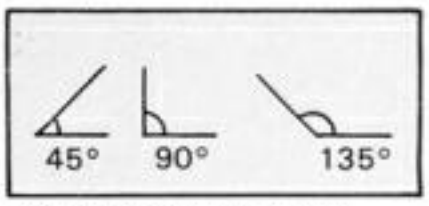

Figure I: Angles and degrees

However while you may measure angles in degrees, the Electron uses a different system of measurement called radians. You're both measuring the same thing but using different units.

It's not unlike the way we have two scales for measuring temperature, Fahrenheit and Celsius. A Fahrenheit degree is not the same as a Celsius degree, each representing the same temperature with a different number. However, whether we call it 0 degrees Celsius or 32 degrees Fahrenheit, it's still freezing point.

It's the same with radians and degrees, they measure the same thing but in different units. And if you're really keen I'll tell you that one radian is the angle subtended at the centre of the circle by an arc of the same length as the radius of that circle.

Maybe Figure II will make that clearer. But don't worry if it doesn't, because the Electron will do it all for you, without you having to worry about radians.

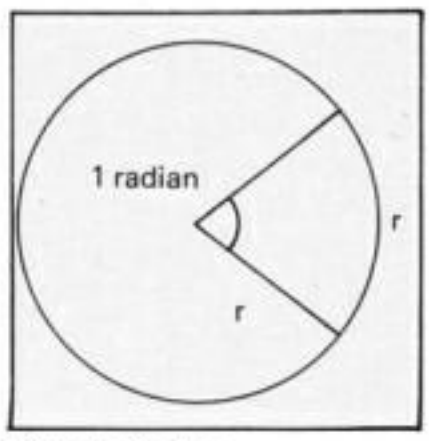

Figure II: A radian

It's easy. If you know the number of degrees in an angle then the RAD function converts this to radians. So if the angle is 45 degrees use:

```
PRINT RAD(45)
```

to give you the result:

```
0.785398163
```

Using RAD you can convert from degrees to radians without knowing much about either. Program I does it for you.

```
  10 REM Program I
  20 INPUT "Give me an ang
le in degrees " angle
  30 PRINT
  40 PRINT ;angle" degrees
 is the same as ";RAD(angle
)" radians"
```

Program I

If you're like me you'll find all the long decimals produced by RAD rather difficult to remember. There is an easier way to think about them. Try:

```
PRINT RAD(180)
```

which, unless your Electron is very different from mine, should result in:

```
3.14159265
```

Now doesn't this remind you of something? Like our old friend PI?

In fact an angle of 180 degrees measured in radians – or circular measure as it's sometimes called – is exactly PI radians. And an angle of 360 degrees is 2*PI radians while one of 90 is 0.5*PI radians. Try it and see.

This is how we normally talk about angles measured in radians, in terms of "so many" PI radians where "so many" is a positive number.

And it's here the constant PI comes in useful as is shown in Program II, which converts degrees into radian measure in the "so many" PI form. Don't worry about @% for the time being, we'll deal with it later.

Table I shows some of the more significant radian measures:

Degrees	Radians
30	PI/6
45	PI/4
60	PI/3
90	PI/2
180	PI
360	2*PI

Table I: Radians and degrees

```
  10 REM Program II
  20 %=&202
  30 INPUT "Give me an ang
le in degrees " angle
  40 PRINT
  50 PRINT ;angle" degrees
 is the same as ";RAD(angle
)/3.14159265" PI radians"
  60 %=&8090A
```

Program II

Having spent so long on PI,

RAD and radians I'll now inform you that there's a Basic function that turns radian measures into degrees.

It's the aptly named DEG function. So, if your Electron has gone through a long and involved calculation and presented you with a result in radians, you can use DEG to convert it to the more meaningful degrees. Program III shows it in action:

```
  10 REM Program III
  30 INPUT "Give me an ang
le in radians " angle
  40 PRINT
  50 PRINT ;angle" radians
 is the same as ";DEG(angle
)" degrees"
```

Program III

After all that, let's see what use we can make of angles measured in radians. Again you'll probably be familiar with the trigonometric functions from the classroom. Figure III should brush up your memory.

The three basic trig functions – as they're known for short – are available on the Electron in the form of SIN, COS and TAN. If you want to know the sine of an angle, say 30 degrees, all you have to do is use SIN. However, beware. If you think that:

```
SIN(30)
```

will give you the sine of 30 degrees then think again. Remember that the Electron uses radian measure, not degrees as we do. So the 30 degrees has to be translated into radians using RAD and then this result is used inside the brackets of SIN. So:

```
PRINT RAD(30)
```

gives the radian equivalent of 30 degrees:

```
0.523598775
```

SIN then gets to work on this and:

```
PRINT SIN(0.523598775)
```

gives the result 0.5 which is the sine of 30 degrees.

However that's a bit longwinded. We can get the same effect with:

```
PRINT SIN(RAD(30))
```

provided that we're careful with our brackets. While you're at it you can find the cosine and tangent of 30 degrees using:

```
PRINT COS(RAD(30))
```

and:

```
PRINT TAN(RAD(30))
```

As well as having functions to allow you to determine the sines, cosines and tangents of angles, the Electron has functions to do the reverse. These are ACS, ASN and ATN. Their argument – the figure in the brackets – is taken to be a trigonometric value and the function produces the angle that corresponds to that value.

Suppose we knew that the number 0.5 is the sine of an angle, but we don't know which angle. We can then use ASN to tell us what the angle is. So SIN gives the sine of an angle while ASN determines the original angle from its sine.

To find the angle that has 0.5 as its sine we use:

```
PRINT ASN(0.5)
```

However the resulting:

```
0.523598775
```

isn't all that meaningful, is it? It's an angle all right but it's measured in radians. The function DEG comes to our rescue as:

```
PRINT DEG(0.523598775)
```

shows. As before it's easier if we do both operations in the same step:

```
PRINT DEG(ASN(0.5))
```

Similarly ACS undoes the work of a cosine while ATN reveals the angle behind a tangent as:

```
PRINT DEG(ACS(0.5))
```

and:

```
PRINT DEG(ATN(1))
```

demonstrate.

Now you know about the trig functions what can you do with them? The answer is quite a lot. The trouble is that it's mostly in mathematical applications that are really beyond the scope of a beginner's series or in graphics.

Happily there's a graphics series starting in *Electron User* soon so you'll get plenty of opportunity to use your new found knowledge.

In the meantime let's try out our trig functions on the rather artificial problem shown in Figure IV.

Have you ever been to one of those summer fairs where the army has an aerial runway? It's a tower with a rope running to the ground at a shallow angle. Intrepid or lemming-related fun-lovers hurl themselves off the tower using a pulley to slide down the rope in safety if not in comfort.

Now while the length of the tower is fixed – we'll assume 100 units – the angle between the rope and the ground, and hence the length of rope needed, varies with the distance of the landing point from the tower. The shallower the angle the longer the rope.

Program IV allows you to try out different distances from the tower, giving you the angle and rope length in each case.

```
  10 REM Program IV
  20 towerHeight=100
  30 INPUT "How far away i
s the landing point from th
e tower? " groundLength
  40 angle=ATN(towerHeight
/groundLength)
  50 ropeLength=towerHeigh
t/SIN(angle)
  60 PRINT
  70 PRINT "The rope lengt
h is ";ropeLength
  80 PRINT
  90 PRINT "The angle is "
;DEG(angle)" degrees"
 100 PRINT
```

Program IV

As I've said it's a fairly artificial problem but it does show the trig functions in use.

Try altering it to solve other aspects of the tower problem. Suppose the rope was only 200 units long. What's the maximum distance the landing point can be from the tower? And see what happens if you decide the distance will be zero (presumably you're abseiling!). Can you mugtrap the input to avoid this error?

● *All that should keep you busy until next time when we'll be exploring that mysterious @% and looking at alternatives to INPUT.*

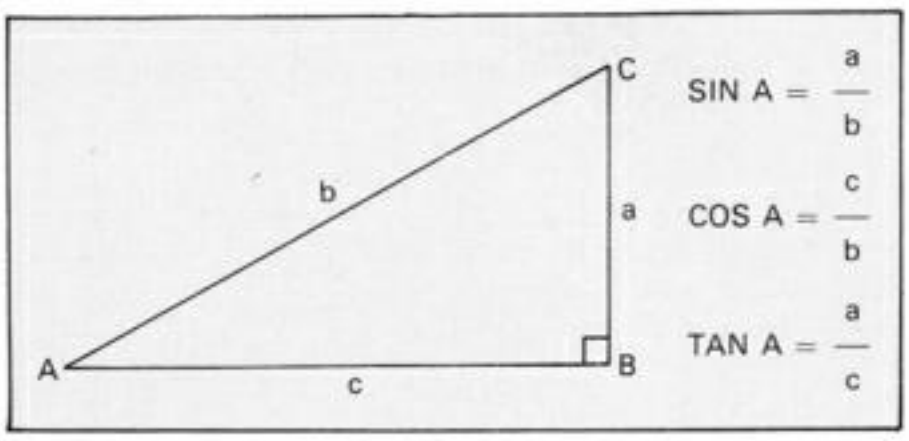

Figure III: Trigonometic functions

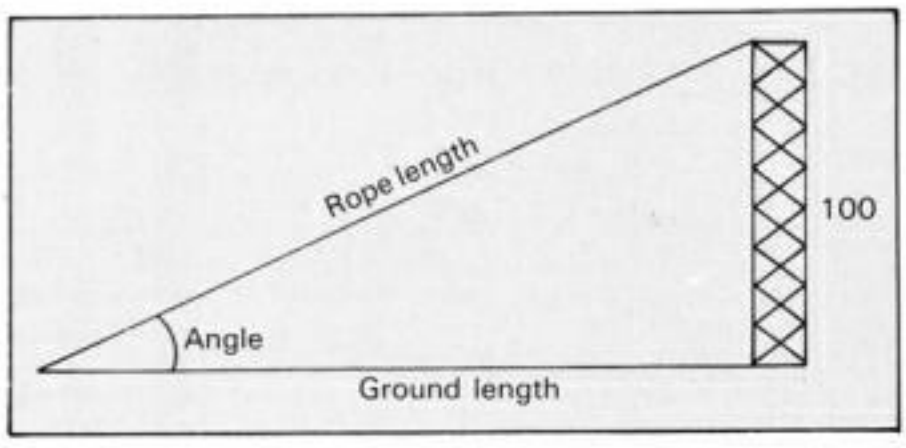

Figure IV: Tower and triangles

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DICER!

ROBERT and MICHAEL CROWE introduce you to this deceptively tricky, intriguing and some times infuriating game

DICER is a simulation of a compelling, traditional dice game which can be played by one to four players. The object is to get the highest score possible by using a set of five dice to tick off each one of a special list of scoring combinations.

Players take turns at throwing the dice, each turn consisting of a maximum of three throws. After each of the first two throws you may:

- Throw all the dice again.
- Hold selected dice and throw the rest.
- Accept the throw as seen.

On the third throw of the dice you must accept the dice shown.

Your task – and the crux of the whole game – is to choose one of the available scoring combinations for that turn's score. Once you've chosen an option you can't pick it again, so take care.

Having made a valid selection your score for that option is calculated and displayed on the score sheet, your running total is updated, and play passes to the next person. The game cycles round all the players until everyone has had 13 turns – sufficient to cover all the scoring combinations possible.

If you should wish to hold some of the dice and re-throw the others, first answer Y to the re-throw prompt.

You will then see displayed above the dice five tick symbols. These indicate the die or dice that will be re-thrown. Selecting the number of the dice that you wish to retain will change the tick to a cross symbol.

If you find you have made an error, entering the number of the appropriate dice will change its symbol back to a tick. Once you are satisfied with your selection, confirm it by pressing the Spacebar and the remaining dice will be thrown again.

When you decide to accept a throw, enter N at the re-throw prompt and you will be asked to enter the category number in which you wish your score to be entered.

There are two sections to the score sheet. The upper section simply totals the number of like dice as shown in Figure I. The lower section consists of special scores based on special combinations such as triplets, as shown in Figure II.

Should the total scores achieved in the upper section – options 1 to 6 – be greater than 61, a bonus of 30 points is awarded.

There will be occasions when the combination displayed after three turns does not match any of the remaining scoring options. You might, for instance, have chosen it earlier.

Should this occur you must pick one of the outstanding options – which will be ticked off the list for a score of zero. The point is that you must always score something at the end of your turn, even if it is a zero.

You'll find Dicer intriguing, thought-provoking and infuriating. Do yourself a favour – type it in today.

Combination	Scoring	Range
Ones	Total all ones	1-5
Twos	Total all twos	2-10
Threes	Total all threes	3-15
Fours	Total all fours	4-20
Fives	Total all fives	5-25
Sixes	Total all sixes	6-30

Figure I: Upper section of score sheet – options 1 to 6

Combination	Description	Score
Triplets	Any three dice the same	Total value of ALL dice
Quads	Any four dice the same	Total value of ALL disc
Full house	Two dice the same, the other three the same	25 points
Low straight	A consecutive run 12345	30 points
High straight	A consecutive run 23456	40 points
Dicer	All five dice the same	55 points
Lucky chance	Any five dice	Total value of ALL dice

Figure II: Lower section of score sheet – special scores

FUNCTIONS

FNval1-6	Used to calculate score.
FNdicetot	Totals all five dice.
FNnumber%(no%)	Calculates how many numbers thrown.
FNreplay	Another game?

ARRAYS

cat%(4,13)	TRUE when category used.
dice%(5)	Each dice's value.
total%(4)	Player's current score.
true%(5)	TRUE when re-throw required.
sc%(4,13)	Stores each player's score in each category.

MAJOR VARIABLES

goes%	Round number.
times%	Player's turn.
tries%	Number of re-throws for current player.
pl%	Number of players.
dot%	Puts dots on dice.
c%	Chosen category.
name$	Category name.

PROCEDURES

envelope	Defines SOUND envelope.
colour	Changes colour.
characters	Defines characters.
players	Prompts for number of players.
variables	Initialises arrays.
set_up	Sets up screen.
window	Clears text window.
cancel	Toggles tick and cross signs.
choose	Prompts for re-throw.
throws	Random number generator for dice.
draw	Draws dice.
dice	Prints ticks and crosses.
cat	Category input.
value	Works out points scored.
printscore	Updates and prints totals.
addition	Calculates final totals.

Dicer listing

```
 10 *FX229,1
 20 REM DICER!
 30 REM BY R and M CROWE
 40 REM (c) ELECTRON USER
 50 MODE1
 60 ON ERROR GOTO 2380
 70 VDU23;8202;0;0;0;
 80 PROCenvelope
 90 PROCcolour
100 PROCcharacters
110 PROCplayers
120 PROCvariables
130 PROCset_up
140 FOR goes%=1TO13
150 FOR times%=1TOpl%
160 PROCwindow
170 tries%=1
180 PROCcancel
190 PROCchoose
200 NEXT:NEXT
210 PROCaddition
220 a$=FNreplay:IF a$="N"
OR a$="n" END ELSE RUN
230 REM**********
240 REM setup envelope
250 DEFPROCenvelope
260 ENVELOPE1,1,1,1,1,1,2,8
,32,126,0,0,-126,126,126
270 ENDPROC
280 REM Number of players
290 DEFPROCplayers
300 PROCtitle
310 *FX15,1
320 PRINTTAB(9,15)"Number
 of players(2-4)?"
330 REPEAT:SOUND1,-15,140
,1
340 key$=GET$:pl%=VAL(key
$)
350 UNTIL pl%<5 AND pl%>1
360 ENDPROC
370 REM**********
380 REM Set up variables
390 DEFPROCvariables
400 DIM cat%(4,13),dice%(
5),total%(4),true%(5),sc%(4
,13)
410 FORloop%=1TO5:true%(l
oop%)=TRUE:NEXT
420 FORloop%=1TO4:FORloop
2%=1TO13:cat%(loop%,loop2%)
=FALSE:NEXT:NEXT
430 ENDPROC
440 REM**********
450 REM define characters
460 DEFPROCcharacters
```

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```
  470 VDU23,224,0,1,2,4,136
,80,32,0,23,225,129,66,36,2
4,24,36,66,129,23,226,255,2
55,255,255,255,255,255,255
  480 ENDPROC
  490 REM********************
  500 REM Set up screen
  510 DEFPROCset_up
  520 PROCtitle
  530 COLOUR0:COLOUR131:PRI
NTTAB(0,3);STRING$(40," ")
  540  COLOUR0:COLOUR131:PR
INTTAB(1,3);"No.";TAB(4,3);
"  Category   ";TAB(17,3);"
 Score      ";TAB(29,3)"Pla
yer"
  550 col%=1:COLOUR128
  560  FORloop%=29TO(27+(pl
%+3)) STEP3
  570 COLOUR col%:IF col%=4
 COLOUR1
  580 PRINTTAB(loop%,4);col
%
  590 col%=col%+1
  600 NEXT
  610 FORloop%=1TO13
  620 COLOUR1:PRINTTAB(0,lo
op%+5);loop%;".";
  630 NEXT
  640 FORloop%=1TO6
  650 COLOUR3:PRINTTAB(0,lo
op%+5);loop%;"'s"
  660 COLOUR2:PRINTTAB(17,l
oop%+5);loop%;"xNo.of";loop
%;"'s"
  670 NEXT
  680 RESTORE2480
  690 FORloop%=7TO13
  700 READ name$,sc%
  710 COLOUR3:PRINTTAB(4,lo
op%+5);name$
  720 COLOUR2:PRINTTAB(17,l
oop%+5);:IF sc%=0 PRINT;"di
ce total" ELSE PRINT;"    "
;sc%
  730 NEXT
  740 MOVE125,400:DRAW125,0
98:MOVE510,400:DRAW510,898:
MOVE898,400:DRAW898,898:MOV
E0,400:DRAW1279,400:MOVE0,4
00:DRAW0,898:MOVE1279,400:D
RAW1279,898:MOVE0,848:DRAW1
279,848
  750 PRINTTAB(1,28);"TOTAL
:"TAB(1)"(Player)"
  760 FORloop%=1TOpl%:COLOU
R loop%:IF loop%=4 COLOUR1
  770 PRINTTAB(9+(4*loop%),
21);loop%:NEXT
  780 COLOUR129:VDU28,0,29,
28,24:CLS
  790 ENDPROC
  800 REM********************
  810 REM change yellow to
cyan
  820 DEFPROCcolour
  830 VDU19,2,6,0,0,0
  840 ENDPROC
  850 REM********************
  860 REM Print title
  870 DEFPROCtitle
  880 COLOUR1:CLS
  890 PRINTTAB(17,0)"DICER!
"
  900 COLOUR3:PRINTTAB(17,1
)"======"
  910 ENDPROC
  920 REM********************
  930 REM ask if rethrow is
 needed
  940 DEFPROCchoose
  950 PROCthrows
  960 tries%=tries%+1
  970 VDU26:PROCwindow
  980 *FX15,1
  990 COLOUR2:PRINTTAB(0,2)
;"RETHROW(Y/N)"
 1000 REPEAT:t$=GET$:UNTIL
t$="Y"OR t$="N"
 1010 IF t$="N" PROCcat:END
PROC
 1020 PROCwindow:COLOUR2
 1030 PRINT"Use keys:"TAB(3
)"12345"TAB(0)"SPACE-CONFIR
M":PRINTCHR$224;"- THROW":P
RINTCHR$225;"- HOLD"
 1040 PROCdice
 1050 PROCthrows:IF tries%=
3 PROCcat:ENDPROC
 1060 GOTO960
 1070 ENDPROC
 1080 REM********************
 1090 REM produce random nu
mber
 1100 DEFPROCthrows
 1110 FOR throw%=1TO5
 1120 IF true%(throw%)=TRUE
 dice%(throw%)=RND(6):PROCd
raw(dice%(throw%),throw%)
 1130 NEXT
 1140 ENDPROC
 1150 REM********************
 1160 REM draw dice
 1170 DEFPROCdraw(no%,d%)
 1180 SOUND&11,1,80,3
 1190 x%=(d%*125)-25:GCOL0,
131
 1200 VDU24,x%-75;100;x%;17
5;:CLG:VDU26
 1210 RESTORE(2400+(no%*10)
)
 1220 FORdot%=1TOno%:READ p
%,y%
 1230 SOUND&10,-15,70,2
 1240 GCOL0,0:p%=p%+x%-75:y
%=y%+100:FOR1%=p%-2TOp%+2:F
ORh%=y%-2TOy%+2:PLOT69,1%,h
%:NEXT:NEXT
 1250 NEXT
 1260 ENDPROC
 1270 REM********************
 1280 REM delete ticks and
crosses
 1290 DEFPROCcancel
 1300 FORloop%=1TO5:true%(l
oop%)=TRUE:
 1310 VDU5:GCOL0,1:MOVE(loo
p%*125)-70,210:PRINTCHR$226
 1320 NEXT:VDU4
 1330 ENDPROC
 1340 REM********************
 1350 REM option to hold di
ce
 1360 DEFPROCdice
 1370 PROCcancel:VDU5
 1380 FORloop%=1TO5
 1390 GCOL0,0:MOVE(loop%*12
5)-70,210:PRINTCHR$224
 1400 MOVE(loop%*125)-70,94
:PRINT;loop%
 1410 NEXT
 1420 REPEAT:*FX15,1
 1430 A$=GET$:UNTIL A$=" "
OR INSTR("12345",A$)<>0
 1440 IF A$=" " VDU4:ENDPRO
C
 1450 t=EVAL(A$)
 1460 MOVE(t*125)-70,210:IF
 true%(t)=TRUE true%(t)=FAL
SE:GCOL0,1:PRINTCHR$226:GCO
L0,0:MOVE(t*125)-70,210:PRI
NTCHR$225 ELSE true%(t)=TRU
E:GCOL0,1:PRINTCHR$226:GCOL
0,0:MOVE(t*125)-70,210:PRIN
TCHR$224
 1470 GOTO1420
 1480 REM********************
 1490 REM enter category no
.
 1500 DEFPROCcat
 1510 REPEAT
 1520 PROCwindow:COLOUR2
 1530 *FX15,1
 1540 PRINTTAB(25,24);"Ente
r cat. no.";
 1550 INPUT c%:UNTIL c%>0 A
ND c%<14
 1560 IF  cat%(times%,c%)=T
RUE GOTO 1510
 1570 cat%(times%,c%)=TRUE
 1580 PROCvalue:PROCprintsc
ore(c%):ENDPROC
 1590 REM********************
 1600 REM clear text window
 1610 DEFPROCwindow
 1620 SOUND&11,-15,150,3
 1630 COLOUR128:VDU28,25,31
,39,23:CLS
 1640 COLOUR times%:IF time
s%=4 COLOUR1
 1650 PRINTTAB(0,0);"Player
";times%;":"
 1660 ENDPROC
 1670 REM********************
 1680 REM value dice depend
ing on category
 1690 DEFPROCvalue
 1700 IF c%<7 sc%(times%,c%
)=FNval1(c%):ENDPROC
 1710 IF c%=7 sc%(times%,c%
)=FNval2(3):ENDPROC
 1720 IF c%=8 sc%(times%,c%
)=FNval2(4):ENDPROC
 1730 IF c%=9 sc%(times%,c%
)=FNval3:ENDPROC
 1740 IF c%=10 sc%(times%,c
%)=FNval4:ENDPROC
 1750 IF c%=11 sc%(times%,c
%)=FNval5:ENDPROC
 1760 IF c%=12 sc%(times%,c
%)=FNval6:ENDPROC
 1770 IF c%=13 sc%(times%,c
%)=FNdicetot:ENDPROC
 1780 REM********************
 1790 REM Print score and u
pdate total
 1800 DEFPROCprintscore(p%)
 1810 COLOURtimes%:IF times
%=4 COLOUR1
 1820 VDU26:PRINTTAB((26+(t
imes%*3)),5+p%);sc%(times%,
p%);
 1830 total%(times%)=total%
(times%)+sc%(times%,p%)
 1840 PRINTTAB(9+(4*times%)
,28);total%(times%)
 1850 ENDPROC
 1860 REM********************
 1870 REM final totals
 1880 DEFPROCaddition
 1890 VDU28,0,31,39,28,17,1
28,12
 1900 FORloop%=1TOpl%
 1910 COLOUR loop%:IF loop%
```

```
=4 COLOUR1
 1920 PRINTTAB(1,loop%*2)"P
layer ";loop%;" Score ";tot
al%(loop%);"+BONUS(";
 1930 no%=sc%(loop%,1)+sc%(
loop%,2)+sc%(loop%,3)+sc%(l
oop%,4)+sc%(loop%,5)+sc%(lo
op%,6)
 1940  IF no%>=62 total%(lo
op%)=total%(loop%)+30:PRINT
;30; ELSE PRINT;0;
 1950 PRINT") =";:PRINT;tot
al%(loop%):NEXT
 1960 ENDPROC
 1970 REM*******************
 1980 REM functions
 1990 DEFFNnumber(no%)
 2000 test%=0:FORloop%=1TO5
 2010 IF dice%(loop%)=no% t
est%=test%+1
 2020 NEXT:=test%
 2030 REM*******************
 2040 DEFFNval1(k%)
 2050 =(k%*FNnumber(k%))
 2060 REM*******************
 2070 DEFFNval2(k%)
 2080 flag%=FALSE
 2090 FOR1%=1TO6
 2100 IF FNnumber(1%)>=(k%)
flag%=TRUE
 2110 NEXT
 2120 IF flag%=TRUE =FNdice
tot ELSE =0
 2130 REM*******************
 2140 DEFFNval3
 2150 1%=0:FORloop%=2TO5
 2160 IF dice%(loop%)<>dice
%(1) 1%=dice%(loop%)
 2170 NEXT:IF 1%=0 THEN =0
 2180 IF (FNnumber(dice%(1)
)=3 AND FNnumber(1%)=2) OR
(FNnumber(dice%(1))=2  AND
FNnumber(1%)=3) THEN =25 EL
SE =0
 2190 REM*******************
 2200 DEFFNval4
 2210 IF FNnumber(3)>=1 AND
 FNnumber(4)>=1 AND ((FNnum
ber(1)>=1 AND FNnumber(2)>=
1)OR (FNnumber(2)>=1 AND FN
number(5)>=1)OR (FNnumber(5
)>=1 AND FNnumber(6)>=1)) T
HEN  =30 ELSE =0
 2220 REM*******************
 2230 DEFFNval5
 2240 IF FNnumber(2)=1 AND
FNnumber(3)=1 AND FNnumber(
4)=1 AND FNnumber(5)=1  AND
 (FNnumber(1)=1 OR FNnumber
(6)=1) THEN =40 ELSE =0
 2250 REM*******************
 2260 DEFFNval6
 2270 five%=FALSE
 2280 FOR1%=1TO6:IF FNnumbe
r(1%)=5 five%=TRUE
 2290 NEXT:IF five%=TRUE =5
5 ELSE =0
 2300 REM*******************
 2310 DEFFNdicetot
 2320 =(dice%(1)+dice%(2)+d
ice%(3)+dice%(4)+dice%(5))
 2330 DEFFNreplay
 2340 COLOUR1:COLOUR128:
 2350 PRINT'TAB(14)"ANOTHER
 GAME(Y/N)?"
 2360 REPEAT:replay$=GET$:U
NTIL INSTR("YyNn",replay$)<
>0
 2370 =replay$
 2380 MODE6:REPORT:PRINT "
at line ";ERL
 2390 REM CAT. DATA
 2400 DATATriplets,0,Quads,
0,Full house,25,Low straigh
t,30,Hi-straight,40,Dicer!,
55,Lucky chance,0
 2410 DATA37,37
 2420 DATA10,65,65,10
 2430 DATA10,65,37,37,65,10
 2440 DATA10,65,65,10,10,10
,65,65
 2450 DATA10,65,65,10,10,10
,65,65,37,37
 2460 DATA10,65,65,10,10,10
,65,65,10,37,65,37
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

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Disc content? Call in the sector editor!

LAST time we saw how to use Osword &72 to read and write data from or to the disc. This month we'll use the same method to produce a sector editor, a utility that will enable us to modify the contents of the disc.

It not only allows files to be edited, but directories as well and this will enable filenames and load and execution addresses to be altered. It can even be used to recover deleted files.

When the editor is run you'll be asked for a disc address in hexadecimal. Enter any number between 0 and &4FF. This is the sector number counting from sector zero on track zero. The sector selected is now loaded into RAM and displayed in both hexadecimal and Ascii.

There are quite a few control keys to remember so I've listed them in Table I.

Each sector is 256 bytes long but only 128 bytes are displayed on the Mode 6 screen. Shift+cursor up displays the first 128 bytes and Shift+cursor down the second 128.

Square brackets enclose the byte to be altered in the hex dump and the cursor flashes underneath the corresponding Ascii character on the right of the screen. The four cursor keys when used on their own allow you to move throughout the 128 bytes displayed.

Shift+cursor right moves on to the next sector while Shift+cursor left moves back a sector. To move quickly across the disc a track at a time use Ctrl+cursor left or right.

To alter a byte press either A to input an Ascii character or H to input the new value in hexadecimal. Note however that this only alters the copy of the sector that has been loaded into RAM. The disc remains unaltered.

The altered sector can be written to the disc by selecting S to save it. You'll see a flashing message at the bottom of the screen asking for confirmation. Pressing Y will save the sector and N will leave it as it was.

A sector editor is a very powerful and essential tool for the disc owner. Be careful though – you can quite easily destroy the contents of a disc.

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EDUCATIONAL 2 BBC/ELECTRON — Tape £6.95 Disc £8.95
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FUN WITH NUMBERS BBC/ELECTRON — Tape £6.95 Disc £8.95
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... 'Very good indeed' ... A&B Computing – Jan/Feb 1984

JIGSAW AND SLIDING PUZZLES by P. Warner BBC/ELECTRON — Tape ~~£7.95~~ Disc ~~£9.95~~
There are two jigsaw and four sliding puzzles on a 3 × 3 and 4 × 4 grid. Each program starts off at an easy level to ensure initial success but gradually becomes harder. It helps children to develop spatial imagination and in solving problems. The tape includes: OBLONG, JIGSAW, HOUSE, NUMBERS, CLOWN and LETTERS.

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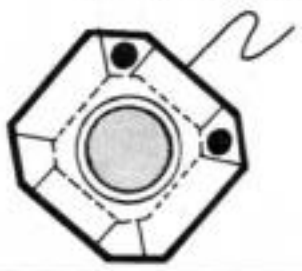

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However you can just as easily restore a corrupted disc as well. Experiment with the editor using a disc which has nothing valuable on to begin with.

Try examining a few discs and see what's there. Find out what happens to the contents when you delete a file, by examining it before and after.

● *Next time we'll see how to restore deleted and corrupted files and we'll write a recover utility.*

Cursor	Move throughout the display
Shift+cursor up/down	Display first or second 128 bytes
Shift+cursor left/right	Move back or forward one sector
Ctrl+cursor left/right	Move back or forward one track
A	Ascii input
H	Hexadecimal input
S	Save the sector

Table I: A summary of the control keys

```
   10 REM Sector Editor
   20 REM By R.A.Waddilove
   30 REM (c) Electron User
   40 ON ERROR OSCLI"FX4":R
EPORT:PRINT" at line ":ERL:
END
   50 MODE 6:HIMEM=&5000
   60 PROCinitialise
   70 REPEAT key$=CHR$GET
   80 IF INSTR("^|\",key$)
 A%=A%-(key$="|")+(key$="^"
)-16*((key$="\")-(key$="*"
)):PROCdisc("read"):PROCdisp
lay
   90 IF key$="'" O%=0:PROC
display
  100 IF key$="_" O%=&80:PR
OCdisplay
  110 IF INSTR("AHah",key$)
 PROCinput
  120 IF INSTR("Ss",key$) P
ROCsave
  130 PROCmove:*FX21
  140 UNTIL FALSE
  150
  160 DEF PROCinitialise
  170 VDU19,0,4;0;
  180 VDU28,1,24,39,0
  190 *MOUNT
  200 *FX4,1
  210 *FX16
  220 cursor$=CHR$136+CHR$1
37+CHR$138+CHR$139
  230 FDC=&900:osword=&FFF1
  240 REPEAT
  250 INPUT'"Input disc add
ress...&"A$
  260 IF A$="" A$=&FFFF
  270 A%=EVAL("&"+A$)
  280 UNTIL A%>-1 AND A%<&5
00
  290 CLS:PRINT TAB(8,1)"AD
FS Sector Editor";TAB(0,3)"
Track:";TAB(12,3);"Sector:"
;TAB(25,3);"Address:&"
  300 PROCdisc("read")
  310 PROCdisplay
  320 xx%=0:yy%=0:key$="":P
ROCmove
  330 ENDPROC
  340
  350 DEF PROCdisc(function
$)
  360 A%=(A%+&500)MOD &500
  370 ?FDC=0
  380 FDC!1=&5000
  390 IF function$="write"
FDC?5=&0A ELSE FDC?5=&08
  400 FDC?6=A% DIV&10000:FD
C?7=(A% DIV &100)AND &FF:FD
C?8=A% AND &FF
  410 FDC?9=1
  420 Z%=A%:A%=&72:Y%=FDC D
IV 256:X%=FDC MOD 256:CALL
osword:A%=Z%
  430 IF ?FDC>0 PRINT TAB(0
,24)"*** Disc Error ***";CH
R$7; ELSE PRINT TAB(0,24);S
PC(20);
  440 ENDPROC
  450
  460 DEF PROCdisplay
  470 A%=(A%+&500)MOD &500:
REM get within range
  480 PRINT TAB(6,3);A%DIV1
6;" ";TAB(19,3);A%MOD16;" "
;TAB(34,3);~A%
  490 PRINT TAB(0,5);
  500 FOR I%=0 TO 15
  510 A$="":PRINT;~(O%+I%*8
)DIV16;(I%*8)MOD16;":";CHR$
9;
  520 FOR J%=0 TO 7
  530 B%=?(&5000+O%+I%*8+J%
)
  540 IF B%>31 AND B%<127 A
$=A$+CHR$B% ELSE A$=A$+"."
  550 PRINT;~B%DIV16;~B%MOD
16;CHR$9;
  560 NEXT
  570 PRINT CHR$9;A$
  580 NEXT
  590 ENDPROC
  600
  610 DEF PROCmove
  620 PRINT TAB(3+xx%*3,5+y
y%);" ";CHR$9;CHR$9;" "
  630 xx%=xx%-(key$=CHR$137
)+(key$=CHR$136):yy%=yy%+(x
x%(0)-(xx%=8):xx%=(xx%+8)MO
D8
  640 yy%=yy%-(key$=CHR$138
)+(key$=CHR$139):yy%=(yy%+1
6)MOD16
  650 PRINT TAB(3+xx%*3,5+y
y%);"[";CHR$9;CHR$9;"]";TAB
(29+xx%,5+yy%);
  660 ENDPROC
  670
  680 DEF PROCinput
  690 PRINT TAB(0,23);"Inpu
t ";
  700 IF INSTR("Hh",key$) I
NPUT "Hex &"A$:IF LEN(A$) B
%=EVAL("&"+A$)
  710 IF INSTR("Aa",key$) I
NPUT "Ascii ";A$:B%=ASC(A$)
  720 PRINT TAB(0,23)SPC(30
)
  730 key$=CHR$137
  740 IF A$="" ENDPROC
  750 ?(&5000+xx%+yy%*8+O%)
=B%
  760 PRINT TAB(4+xx%*3,5+y
y%);~B%DIV16;~B%MOD16;TAB(2
9+xx%,5+yy%);
  770 IF B%>31 AND B%<127 V
DU B% ELSE PRINT".";
  780 ENDPROC
  790
  800 DEF PROCsave
  810 PRINT TAB(10,23)": Ar
e you sure?"
  820 REPEAT key$=INKEY$50:
*FX21
  830 COLOUR1:COLOUR128:PRI
NT TAB(0,23)"SAVE";:COLOUR0
:COLOUR129:PRINTCHR$9;"DATA
"
  840 FOR I%=0 TO 2000:NEXT
  850 COLOUR0:COLOUR129:PRI
NT TAB(0,23)"SAVE";:COLOUR1
:COLOUR128:PRINTCHR$9;"DATA
"
  860 UNTIL INSTR(" YyNn",k
ey$)>1
  870 IF INSTR("Yy",key$) P
ROCdisc("write")
  880 PRINT TAB(0,23)SPC(30
)
  890 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

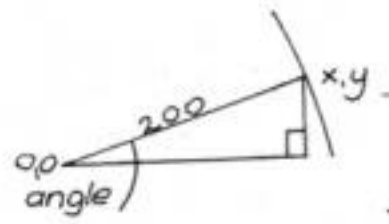
Triangular circles

Notebook

THIS month's program has the Electron producing a circle made up of triangles, courtesy of the functions RAD, SIN and COS along with a little relative plotting.

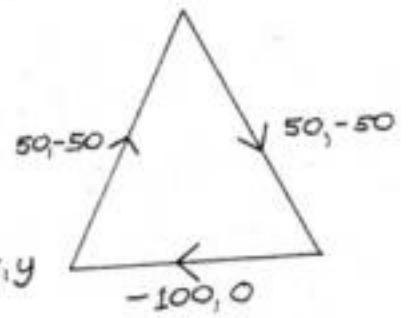
```
10 REM CIRCLE OF TRIANGLES
20 REM TREVOR ROBERTS
30 MODE 0
40 VDU 29,640;512;
50 FOR loop= 0 TO 360 STEP 15
60 angle=RAD(loop)
70 x=200*SIN(angle)
80 y=200*COS(angle)
90 PROCtriangle(x,y)
100 NEXT loop
110 END
120 DEF PROCtriangle(x,y)
130 MOVE x,y
140 PLOT 1, 50,50
150 PLOT 1,50,-50
160 PLOT 1,-100,0
170 ENDPROC
```

origin to centre of screen



calculates point on circle's edge

FOR...NEXT loop cycles 24 times calling procedure each time



relative plotting

procedure definition

10,20 Label the program. Everything on a line after a REM is ignored by the micro.

30 Puts the Electron into Mode 0, the two colour, high resolution mode. This uses up a lot of memory, 20k, but since the program is so short it's not a problem.

40 Moves the graphics origin – the zero point for the MOVE and DRAW commands – to the centre of the screen.

50-100 Form a FOR . . . NEXT loop with control variable *loop*. This cycles 24 times as loop goes from 0 to 360 in steps of 15. If this reminds you of your school geometry, full marks. It's no coincidence that there are 360 degrees in a circle.

60 Uses the function RAD to convert the value of *loop* into a number of radians and stores them in *angle*. This is done because the functions COS and SIN work in radian measure, not the more familiar degrees.

70,80 Use SIN and COS to calculate the coordinates of a point on a circle centred on the origin and with radius 200.

90 Calls PROCtriangle using the coordinates calculated in the previous two lines. As the loop cycles each of these pairs of coordinates will be positioned further round the circumference of the circle. The result is the circle of triangles.

110 Stops the program crashing into the procedure definition.

120-170 Make up the procedure which draws the triangle. When it's called from the main program values are passed to the procedure to use in place of the dummy variables, *x* and *y*.

130 MOVEs the graphics cursor to the point *x,y*. Each time the procedure is called *x,y* will be further round the circle.

140 The PLOT 1,50,50 command tells the Electron to draw a line from the present position of the graphics cursor to the point which is 50 units further along the X axis and 50 units further up the Y axis. Notice that these coordinates are relative, not absolute. If the graphics cursor is at *x,y* then PLOT 1,50,50 will move the graphics cursor to x+50, y+50.

150,160 Also draw lines using relative plotting. Three lines are drawn and, as the totals of the relative X and Y coordinates are 0 and 0 respectively, they come back to the starting point. A triangle is born!

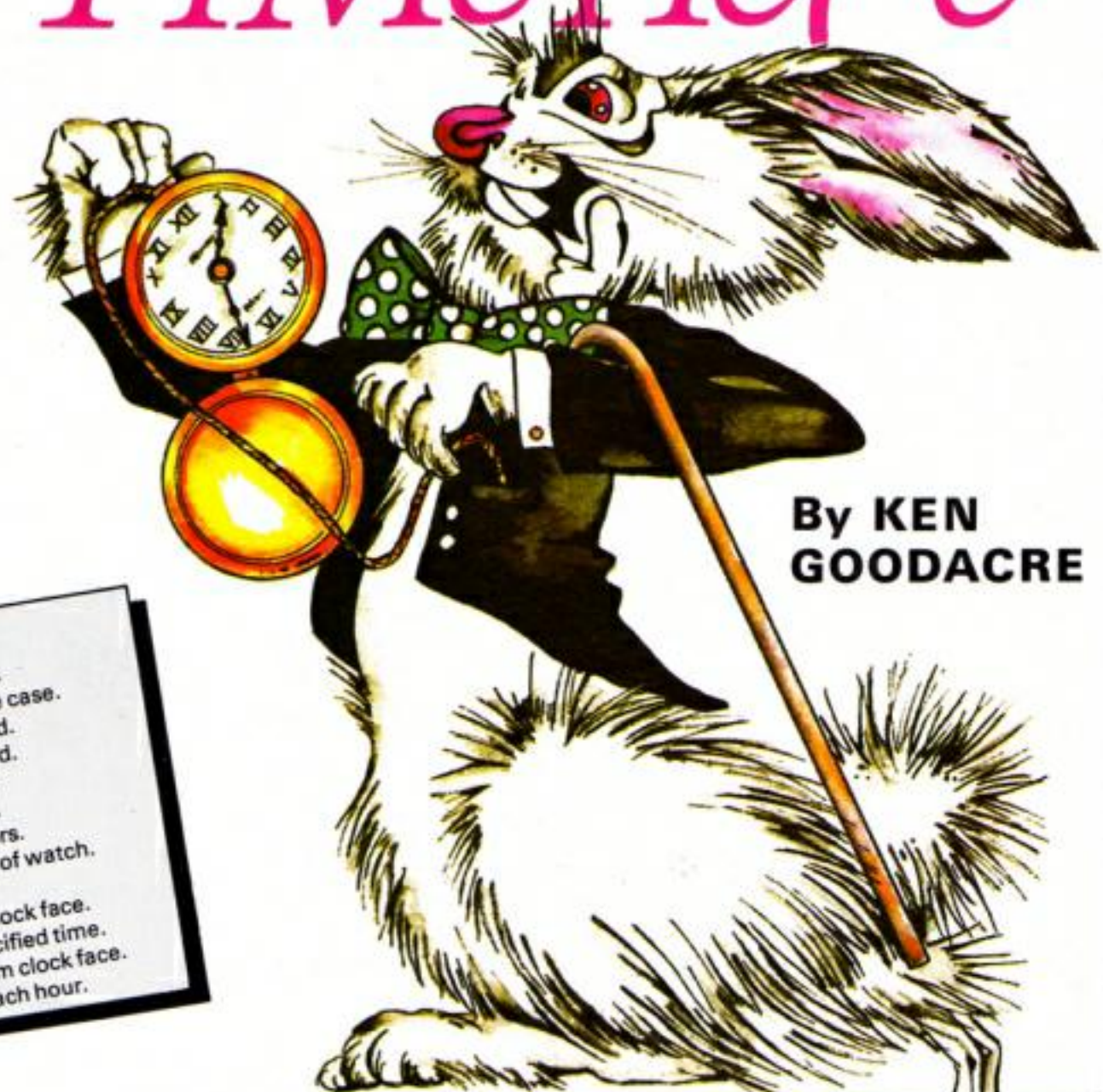
170 Ends the procedure. Can you write one that produces rectangles or stars or even circles?

Try adding these lines and see what happens to the triangles:

```
44 GCOL 3,3
48 FOR T=1 TO 5
100 NEXT T
108 PROCtriangle(x,y)
```

Trevor Roberts

TIMEPIECE



By KEN GOODACRE

TIMEPIECE is a superb graphics program which animates the hands on a fob watch.

When the program is RUN a set of arrays are initialised to speed up the drawing of the watch.

This takes quite some time – no pun intended – so please be patient.

Once this is complete the fob watch is drawn on the screen with great speed and you can enter the correct time.

You can reset this by pressing the Shift key once the hands are moving.

Now you can sit back, relax and enjoy the superbly animated hands as they sweep around the clock face.

PROCEDURES

array	Initialises data arrays.
case	Draws sections of the case.
seconds	Updates second hand.
minutes	Updates minute hand.
hour	Updates hour hand.
init	Initialises variables.
error	Traps program errors.
knurl	Draws knurl at top of watch.
face	Draws clock face.
name	Draws name on clock face.
set	Sets clock to specified time.
reset	Erases hands from clock face.
strike	Sounds chime each hour.

Timepiece listing

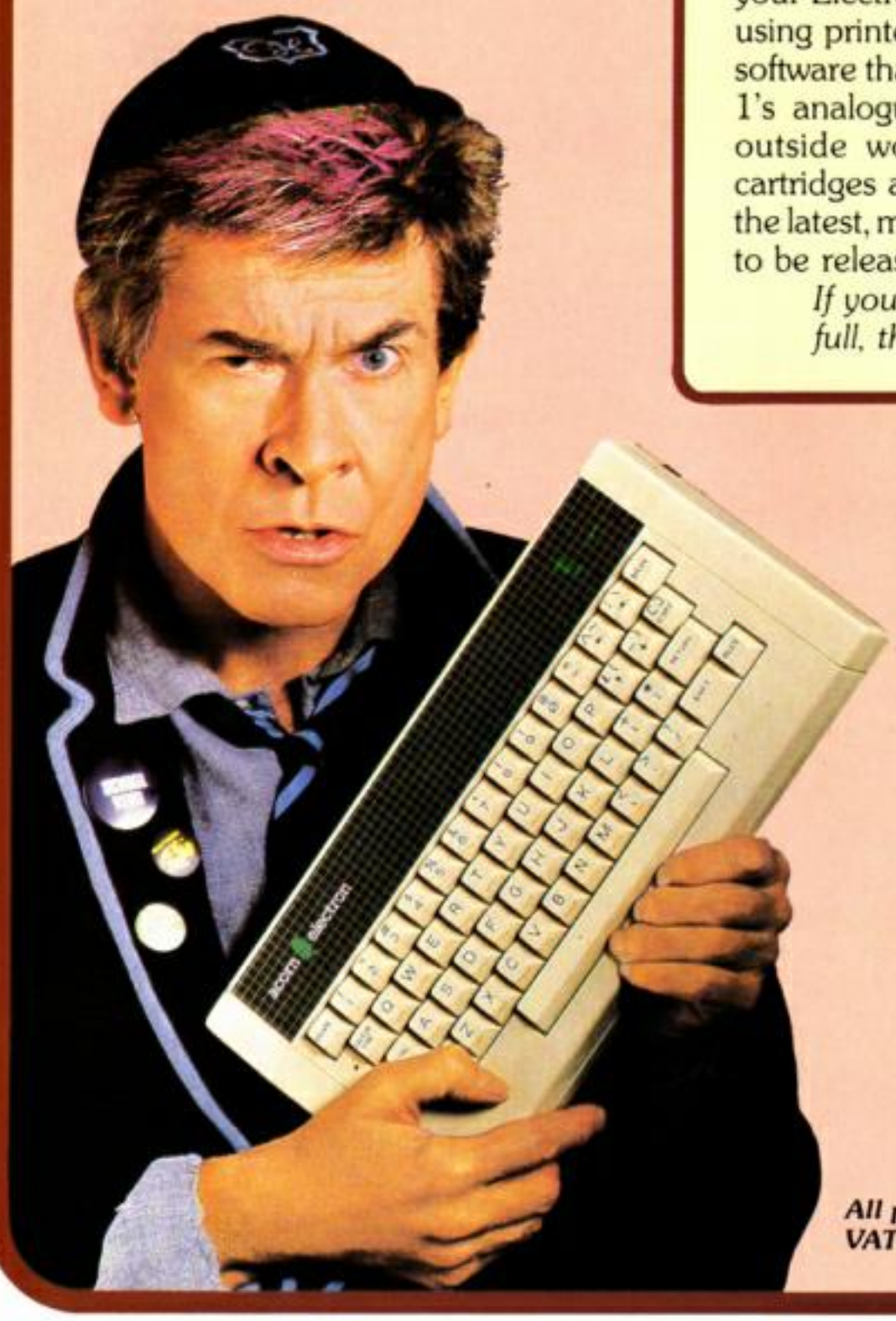
```
  10REM Timepiece
  20REM By K.Goodacre
  30REM (C) Electron User
  40ON ERROR:MODE6:PROCerr
or:END
  50MODE4:VDU23,1;0;0;0;0;
:PROCinit
  60PRINTTAB(10,2)"T I M E
 - P I E C E"
  70PRINTTAB(14,6)".   B y
  ."
  80PRINTTAB(10,9)"K . G o
 o d a c r e"
  90PRINTTAB(14,13)"Please
 Wait,"
 100PRINTTAB(4,16)"While A
rray's Are Calculated.....
"
 110PROCarray(0.5,0.8,6,0)
 120PRINTTAB(7,19);B$c%C$:
c%=c%+1
 130PROCarray(1.6,0.23,12,
1)
 140PRINTTAB(7,21);B$c%C$:
c%=c%+1
 150PROCarray(1.6,0.25,12,
2)
 160PRINTTAB(7,23);B$c%C$:
c%=c%+1
 170PROCarray(1.6,0.35,12,
3)
 180PRINTTAB(7,25);B$c%C$:
c%=c%+1
 190PROCarray(0.4,0.6,12,4
)
 200PRINTTAB(7,27);B$c%C$:
c%=c%+1
 210TIME=0:REPEAT UNTIL TI
ME>=80
 220CLS:VDU28,15,7,39,5:VD
U5
 230PROCcase(0,1,310,345,6
30,1,1,30)
 240PROCcase(0,1,350,340,6
20,1,2,30)
 250PROCcase(0,1,130,325,6
30,1,2,30)
 260PROCcase(0,1,120,315,6
30,1,2,15)
 270PROCcase(15,1,350,340,
620,1,3,30)
 280PROCcase(0,2,350,730,3
45,1,0,60)
 290PROCcase(0,2,310,730,3
60,1,0,60)
 300PROCcase(0,2,300,730,3
60,3,0,60)
 310PROCcase(0,1,290,730,3
60,2,0,60)
 320PROCcase(0,2,110,715,2
00,4,0,60)
 330PROCcase(0,2,95,1160,3
90,1,0,60)
 340PROCcase(0,2,60,1125,3
90,3,0,60)
 350PROCcase(4,2,330,730,3
55,1,0,6)
 360PROCcase(4,2,325,730,3
55,1,0,6)
 370PROCcase(0,2,55,1125,3
90,4,0,60)
 380PROCcase(0,1,60,1125,3
90,4,4,30)
 390PROCknurl:PROCface:PRO
Cset:GCOL3,1
 400REPEAT:REPEAT:IFINKEY-
1PROCreset
 410UNTIL TIME>=100:TIME=0
:PROCseconds
 420IFflag%=1PROCstrike
 430UNTIL FALSE
 440:
 450DEFPROCarray(tilt,pitc
h,step%,bne%)
 460B%=0:FORA=0TO360STEPst
ep%
 470X=(COS(tilt)*COS(RAD(A
))+SIN(tilt)*SIN(RAD(A))*pi
tch)
 480Y=(COS(RAD(A))*SIN(til
t)-SIN(RAD(A))*COS(tilt)*pi
tch)
 490IFbne%=0xa0(B%)=X:ya0(
B%)=Y
```

Turn to Page 34

Never before have there been such money-saving offers for readers of a computer magazine!

EXPAND your Electron

. . . for much, much less than the price you'd normally p



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With the Plus 1, you and your Electron enter a whole new computing dimension. The Plus 1 turns your Electron into a fully fledged micro capable of using printers, joysticks and cartridge ROMs – the software that comes on a chip. In addition, the Plus 1's analogue to digital port gives access to the outside world – while the slots for the ROM cartridges allow the Electron to take advantage of the latest, most exciting hardware developments yet to be released.

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Bring the speed of discs and the organised memory of a pe your Electron with the Electron Data Manager. It cons interface and Acorn's official disc-based Database – a disc keep track of things quickly, reliably and efficiently. Sophisti fast, the Data Manager is a must for all serious Electron a

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Now you can dramatically extend your programming horizons with this exclusive offer from Electron User. It comes complete with the Plus 1 interface and the Pascal and Logo cartridge ROMs. The Language Lab frees you from the limitations of Basic by giving you the two most educationally favoured high level programming languages – Logo and Pascal.

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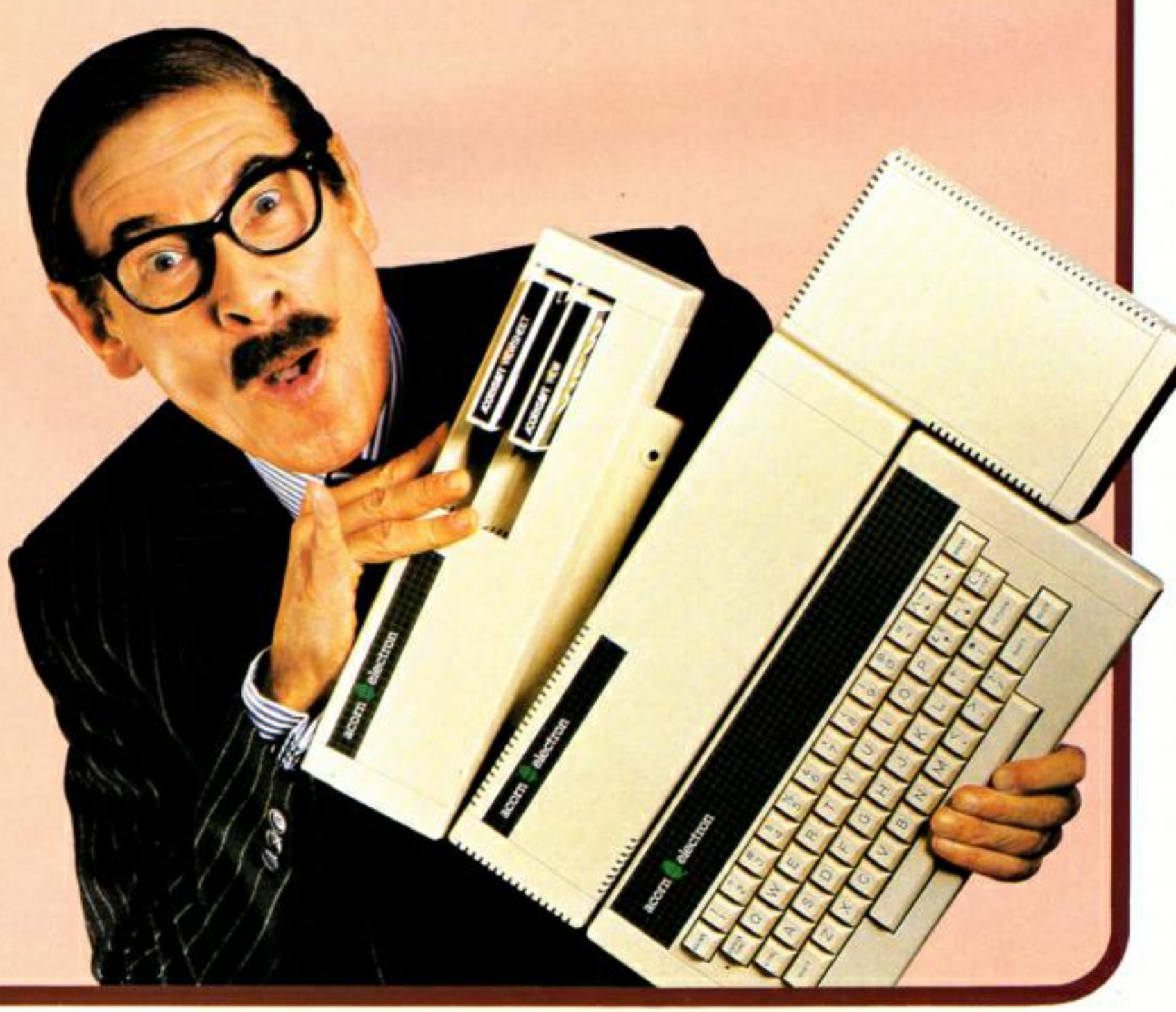

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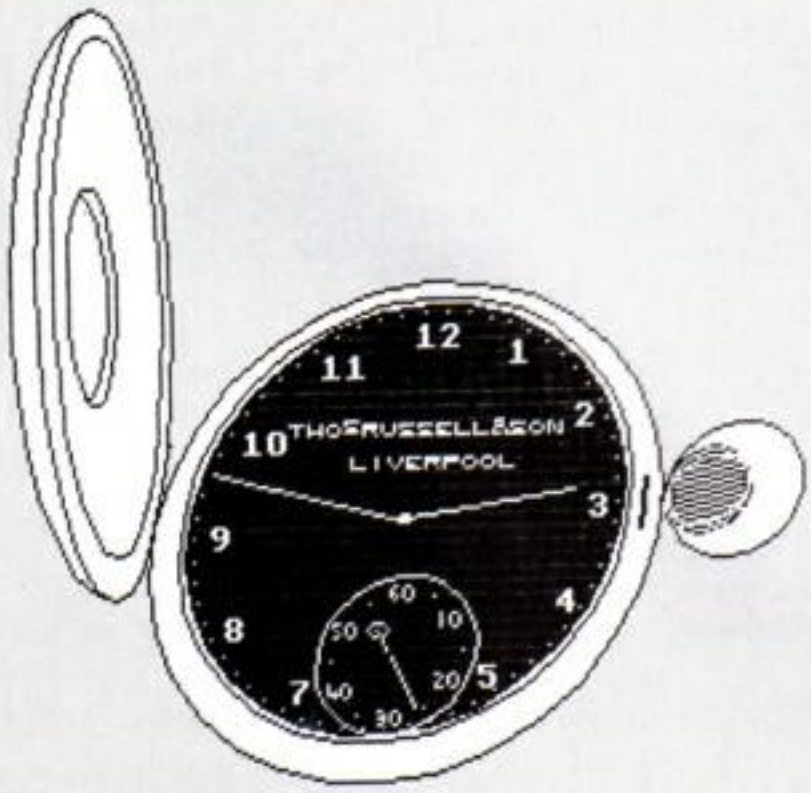
on Page 61

Timepiece listing

From Page 31

```
  500IFbneZ=1xa1(BZ)=X:ya1(
BZ)=Y
  510IFbneZ=2xa2(BZ)=X:ya2(
BZ)=Y
  520IFbneZ=3xa3(BZ)=X:ya3(
BZ)=Y
  530IFbneZ=4xa4(BZ)=X:ya4(
BZ)=Y
  540BZ=BZ+1:NEXT:ENDPROC
  550:
  560DEFPROCcase(stZ,stepZ,
xizeZ,xposZ,yposZ,beqZ,bneZ
,finZ)
  570IFbeqZ=0ORbeqZ=20RbeqZ
=46COL0,0ELSEGCOL0,1
  580IFbneZ=0MOVExposZ+xize
Z+xa0(stZ),yposZ+xizeZ+ya0(
stZ)
  590IFbneZ=1MOVExposZ+xize
Z+xa1(stZ),yposZ+xizeZ+ya1(
stZ)
  600IFbneZ=2MOVExposZ+xize
Z+xa2(stZ),yposZ+xizeZ+ya2(
stZ)
  610IFbneZ=3MOVExposZ+xize
Z+xa3(stZ),yposZ+xizeZ+ya3(
stZ)
  620IFbneZ=4MOVExposZ+xize
Z+xa4(stZ),yposZ+xizeZ+ya4(
stZ)
  630FORB=stZTOfinZSTEPstep
Z
  640IFbneZ=0XZ=xposZ+xizeZ
*xa0(B):YZ=yposZ+xizeZ*ya0(
B)
  650IFbneZ=1XZ=xposZ+xizeZ
*xa1(B):YZ=yposZ+xizeZ*ya1(
B)
  660IFbneZ=2XZ=xposZ+xizeZ
*xa2(B):YZ=yposZ+xizeZ*ya2(
B)
  670IFbneZ=3XZ=xposZ+xizeZ
*xa3(B):YZ=yposZ+xizeZ*ya3(
B)
  680IFbneZ=4XZ=xposZ+xizeZ
*xa4(B):YZ=yposZ+xizeZ*ya4(
B)
  690IFbeqZ=1ORbeqZ=4DRAWXZ
,YZ
  700IFbeqZ=2PLOT69,XZ,YZ
  710IFbeqZ=3MOVExposZ,ypos
Z:PLOT85,XZ,YZ
  720NEXT:ENDPROC
  730:
  740DEFPROCseconds
  750MOVE705,200:DRAWxsZ,ys
Z
  760MOVE705,200:DRAWxbZ,yb
Z
  770MOVExbZ-12,ybZ+12:VDU2
25
  780SZ=SZ+1:bZ=bZ+1
  790xsZ=705+90*xa0(SZ)
  800ysZ=200+90*ya0(SZ)
  810xbZ=705+40*xa0(bZ)
  820ybZ=200+40*ya0(bZ)
  830MOVE705,200:DRAWxsZ,ys
Z
  840MOVE705,200:DRAWxbZ,yb
Z
  850MOVExbZ-12,ybZ+12:VDU2
25
  860IFSZ=59PROCminutes
  870IFSZ=60SZ=0
  880IFbZ=60bZ=0
  890ENDPROC
  900:
  910DEFPROCminutes
  920MOVE729,359:DRAWxmZ,ym
Z
  930MZ=MZ+1:IFMZ=60MZ=0
  940xmZ=730+290*xa0(MZ)
  950ymZ=360+290*ya0(MZ)
  960MOVE729,359:DRAWxmZ,ym
Z:GCOL0,0
  970MOVE730-12,360+12:VDU2
26:GCOL3,1
  980IFMZ=20RMZ=140RMZ=260R
MZ=380RMZ=50PROChour
  990IFMZ=50RMZ=200RMZ=35SO
UND1,1,100,1
 1000IFMZ=59flagZ=1
 1010ENDPROC
 1020:
 1030DEFPROChour
 1040MOVE731,361:DRAWxhZ,yh
Z
 1050HZ=HZ+1:IFHZ=60HZ=0
 1060strikeZ=HZ+10
 1070IFHZ=55strikeZ=5
 1080xhZ=730+230*xa0(HZ)
 1090yhZ=360+230*ya0(HZ)
 1100MOVE731,361:DRAWxhZ,yh
Z:GCOL0,0
 1110MOVE730-12,360+12:VDU2
26:GCOL3,1
 1120ENDPROC
 1130:
 1140DEFPROCinit
 1150DIMxa0(60):DIMya0(60)
 1160DIMxa1(30):DIMya1(30)
 1170DIMxa2(30):DIMya2(30)
 1180DIMxa3(30):DIMya3(30)
 1190DIMxa4(30):DIMya4(30)
 1200HZ=50:MZ=50:SZ=50:cZ=0
 1210RESTORE2260:FORA=225TO
246
 1220READB,C,D,E,F,G,H,I
 1230VDU23,A,B,C,D,E,F,G,H,
I:NEXT
 1240B$="Set Up x and y Arr
ay"
 1250C$=" ok!"
 1260ENVELOPE1,2,3,0,0,0,0,
0,80,-1,-1,-1,90,90
 1270ENDPROC
 1280:
 1290DEFPROCerror:VDU14
 1300REPORT:PRINT" at line"
;ERL:ENDPROC
 1310:
 1320DEFPROCknurl:GCOL0,0
 1330FORA=344TO408STEP8
 1340MOVE1000,A:DRAW1170,A+
20
 1350NEXT:ENDPROC
 1360:
 1370DEFPROCface:GCOL0,0:PR
OCname
 1380A=241:cZ=1:nZ=51
 1390FORB=5TO60STEP5
 1400XZ=720+260*xa0(B)
 1410YZ=370+260*ya0(B):MOVE
XZ,YZ
 1420IFcZ(=7ANDB()20PRINTCH
R$(nZ)
 1430IFcZ)7ANDcZ(11PRINTCHR
$(49)+CHR$(aZ)
 1440IFcZ)=10cZ=1:nZ=48
 1450IFcZ=7aZ=79
 1460IFcZ=8aZ=49
 1470IFcZ=9aZ=50
 1480nZ=nZ+1:cZ=cZ+1:NEXT
 1490FORB=0TO50STEP10
 1500XZ=700+85*xa0(B)
 1510YZ=220+85*ya0(B):MOVEX
Z,YZ
 1520PRINTCHR$(A):A=A+1:NEX
T
 1530FORB=5TO55STEP10
 1540XZ=715+90*xa0(B)
 1550YZ=200+90*ya0(B)
 1560PLOT69,XZ,YZ:NEXT:ENDP
ROC
 1570:
 1580DEFPROCname:RESTORE163
0
 1590X=580:Y=490:FORA=1TO15
:READB
 1600MOVEX,Y:PRINTCHR$B:X=X
+24:NEXT
 1610X=660:Y=450:FORA=1TO9:
READB
 1620MOVEX,Y:PRINTCHR$B:X=X
+24:NEXT
 1630DATA235,236,233,239,23
1,234,238,238,230,227,227,2
40,238,233,237
 1640DATA227,228,229,230,23
1,232,233,233,227
 1650ENDPROC
 1660:
 1670DEFPROCset:GCOL0,0:fla
gZ=0
 1680*FX21
 1690MOVE730-12,360+12:VDU2
26
 1700VDU4:INPUT"HOURS?"hZ:V
DU5
 1710IFhZ(10RhZ)12hZ=12
 1720hZ=hZ*5
 1730IFhZ)=10hZ=hZ-10:GOTO1
750
 1740IFhZ(10hZ=hZ+50
 1750IFSZ)=30bZ=SZ-30:GOTO1
770
```



```
1760IFS%<30b%=S%+30
1770GCOL3,1
1780xs%=705+90*xa@(S%)
1790ys%=200+90*ya@(S%)
1800xb%=705+40*xa@(b%)
1810yb%=200+40*ya@(b%)
1820MOVE705,200:DRAWxs%,ys
%
1830MOVE705,200:DRAWxb%,yb
%
1840MOVExb%-12,yb%+12:VDU2
25
1850xm%=730+290*xa@(M%)
1860ym%=360+290*ya@(M%)
1870MOVE729,359:DRAWxm%,ym
%
1880xh%=730+200*xa@(H%)
1890yh%=360+200*ya@(H%)
1900MOVE731,361:DRAWxh%,yh
%
1910GCOL0,0:MOVE730-12,360
+12:VDU226
1920GCOL3,1:REPEAT:PROChou
r:UNTILH%=h%
1930GCOL0,0:MOVE730-12,360
+12:VDU226
1940VDU4:INPUT"MINUTES?"m%
:VDU5
1950IFm%<10Rm%>60m%=0
1960IFm%>=10m%=m%-10:GOTO1
980
1970IFm%<10m%=m%+50
1980GCOL3,1
1990IFm%<>50REPEAT:PROCmin
utes:UNTILM%=m%
2000GCOL0,0:MOVE730-12,360
+12:VDU226
2010VDU4:INPUT"SECONDS?"s%
:VDU5
2020IFs%<10Rs%>60s%=0
2030IFs%>=10s%=s%-10:GOTO2
050
2040IFs%<10s%=s%+50
2050GCOL3,1
2060IFs%<>50REPEAT:PROCsec
onds:UNTILS%=s%
2070VDU4:PRINT"Press Space
 Bar To Start"
2080PRINT"Press Shift To R
eset"
2090REPEATUNTILGET=32:TIME
=0:CLS:VDU5
2100ENDPROC
2110:
2120DEFPROCreset:H%=50:M%=
50:S%=50
2130MOVE705,200:DRAWxs%,ys
%
2140MOVE705,200:DRAWxb%,yb
%
2150MOVExb%-12,yb%+12:VDU2
25
2160MOVE729,359:DRAWxm%,ym
%
2170MOVE731,361:DRAWxh%,yh
%
2180PROCset:ENDPROC
2190:
2200DEFPROCstrike:SOUND1,1
,193,1
2210SOUND2,1,177,1:SOUND3,
1,165,1
2220strike%=strike%-5
2230IFstrike%=0flag%=0
2240ENDPROC
2250:
2260DATA0,60,66,129,66,60,
0,0 ,0,0,56,124,56,0,0,0 ,0
,0,0,0,128,128,128,248 ,0,0
,0,0,32,32,32,32 ,0,0,0,0,1
36,136,80,32 ,0,0,0,0,248,1
28,224,248 ,0,0,0,0,248,248
,144,136
2270DATA0,0,0,0,248,248,12
8,128 ,0,0,0,0,112,136,136,
112 ,0,0,0,0,136,136,136,11
2 ,0,0,0,0,248,32,32,32 ,0,
0,0,0,136,136,248,136 ,0,0,
0,0,200,168,168,152 ,0,0,0,
0,248,128,112,248
2280DATA0,0,0,248,128,112,
248,0 ,0,0,0,112,80,112,136
,236 ,0,0,0,0,140,146,146,146
,140 ,0,0,0,0,196,41,73,137,2
30 ,0,0,0,0,198,41,233,41,198
 ,0,0,0,0,134,137,169,249,38
,0,0,0,0,230,137,73,41,198 ,0
,0,0,0,102,137,201,169,70
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

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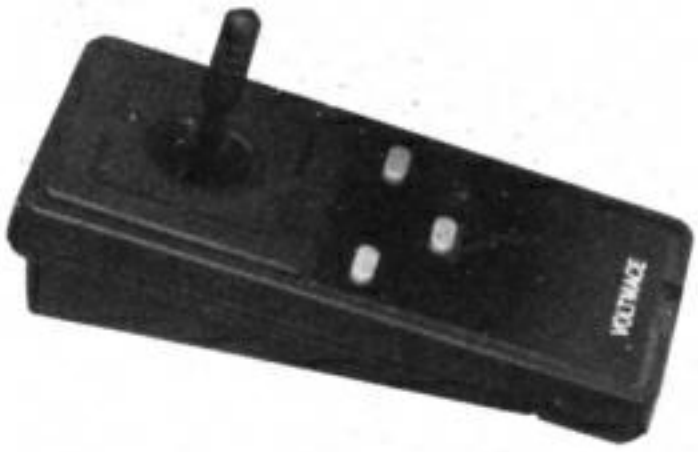

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Try a tablet for pixel resolution

ROBIN NIXON tests the Tarantula Touch Tablet

THOSE of you who have used light pens on the Electron will have discovered their limitation – low resolution. This is because a light pen can only respond to a character-sized cell.

Sometimes this is overcome by introducing a drag factor whereby a cursor is dragged in the general direction the pen is moving, giving the illusion of pixel resolution.

However this can be clumsy, and only works if the pen is moving – not ideal for drafting.

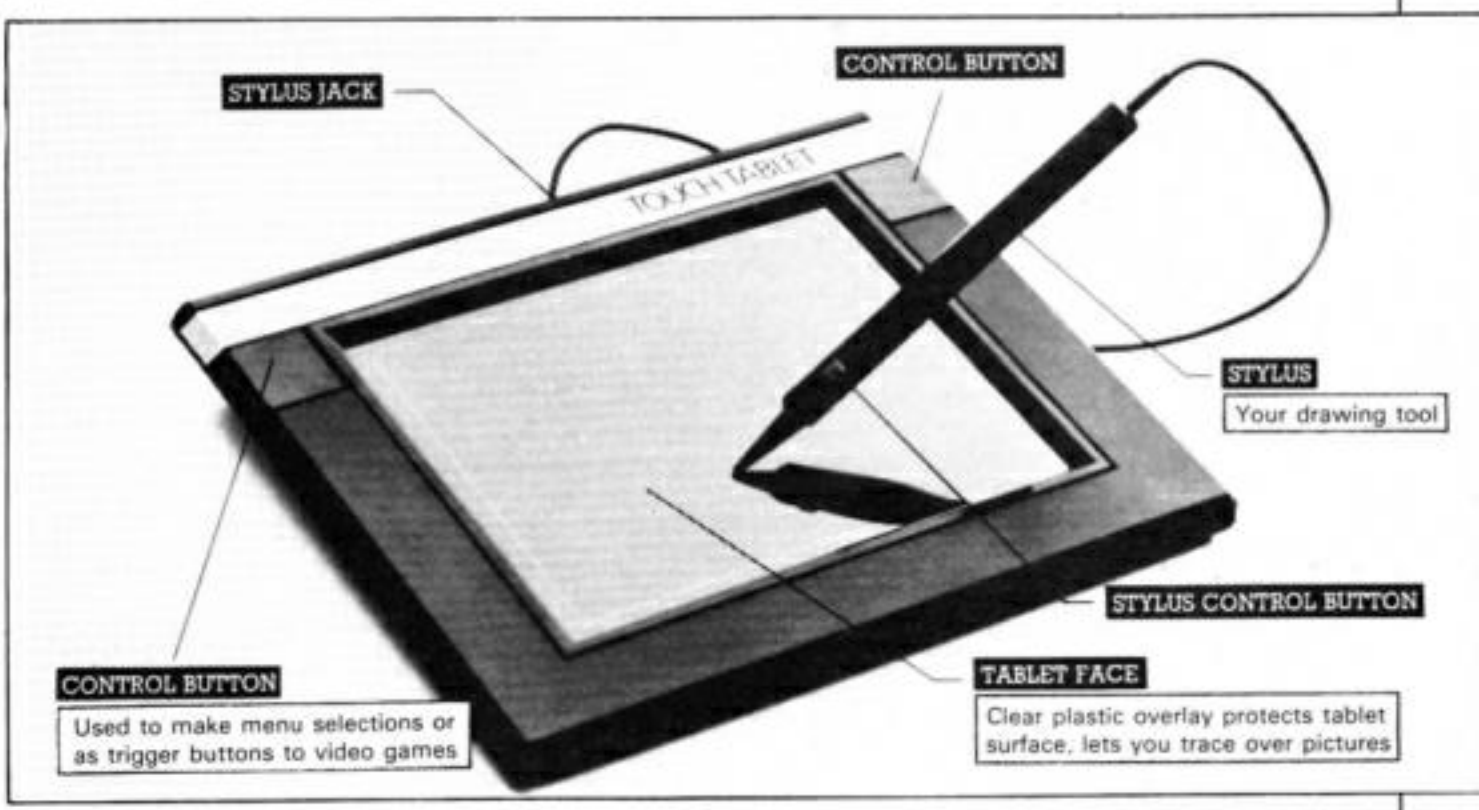
The Tarantula Touch Tablet from Wigmore House works in a similar way to a light pen except that the tablet takes the place of the screen and will give you pixel resolution.

It is small enough to fit neatly beside your Electron, but can easily be moved to a more convenient position as it comes with a metre of flex. It connects into the ADVAL port of the Plus 1.

You draw on the tablet with a pen which is connected to it by about half a metre of wire. A button on the end of the pen switches it on and off.

Being triangular rather than round, the pen is easy to hold and the button comfortable to press.

The program accompanying the Tarantula is Mousepaint, the same program used by the Wigmore trackball with a few extensions. (We reviewed the trackball in the October 1985 issue of *Electron User*.)



Mousepaint runs in Mode 1. Down the right hand side of the screen is a menu of icons and letters showing the options available.

To select from the menu you touch the corresponding area on the tablet with your pen and press the button.

Some of the many options available are listed in the adjoining panel.

Let's follow one of these options through in practice. To draw a rectangle you first move to the rectangle icon and press the switch.

Then move over to one corner of the rectangle and press the switch again.

Now as you move the pen you see a rectangle being dragged about. When you are satisfied with its size and position you press the switch again and the rectangle is fixed in place.

The horizontal/vertical line draw is a nice idea which I used a lot.

You plot two points roughly where you want a line to be and the program will put the line exactly in place. This is very useful if your hands are still shaking from the night before or you accidentally jerk the pen at the last moment.

The program is so easy to use that the only time you need to touch the keyboard is when you are entering text.

On selection of the text icon a prompt appears in a small window at the bottom of the screen. You then type in your text, press Return, move the pen to where you want the text to go, and press the button.

All in all this is a nice package which has many applications, from designing your own screens and title pages to quite sophisticated technical drawing.

As the software's in Basic and is unprotected you can adapt the Tarantula so that it grows with your needs.

- ★ **Freehand sketching.** *What you draw is what you get.*
- ★ **Line rubber-banding.** *After plotting a start point a line is stretched between it and wherever the pen is positioned until the button is pressed, when the line is fixed in place.*
- ★ **Rectangle rubber-banding.** *As with line rubber-banding, only producing rectangles.*
- ★ **Horizontal/vertical line draw.** *A feature to make perfect horizontal or vertical lines out of slightly diagonal ones.*
- ★ **Circles.** *Where you plot the centre and a point on the circumference.*
- ★ **Dotted lines.** *As with line rubber-banding but dotted.*
- ★ **Text.** *This enables you to enter text anywhere you want it on screen.*
- ★ **Fill.** *A partial fill which may need to be used several times to fill large, complicated shapes.*

Some of the options available using the Tarantula Touch Tablet

Ready Reference

Collect the Electron User Ready Reference charts – and have all the facts at your fingertips!

ASC

Returns the Ascii code of the string inside the brackets. Hence:

```
PRINT ASC("a")
```

gives 97. Notice that:

```
string$="centigrade"
PRINT ASC(string$)
```

just gives the Ascii code of the first letter of the string.

CHR$

Translates an Ascii code into the character it represents. So:

```
PRINT CHR$(65);CHR$(66);
CHR$(67)
```

gives:

```
ABC
```

You can also use the Ascii control codes, so:

```
PRINT CHR$(7)
```

rings the bell while the printer can be turned on and off with:

```
PRINT CHR$(2)
PRINT CHR$(3)
```

LEN

Provides the answer to the question: "How long is a string?" It gives the number of characters in a string. Hence:

```
PRINT LEN("centigrade")
```

returns 10. Notice that:

```
PRINT LEN("-12")
```

gives the answer 3. The minus sign counts.

STRING$

Used to create large strings from smaller ones. So if you want a line of 20 asterisks you can use:

```
asterisk$=STRING$(20,"*")
PRINT asterisk$
```

It's recommended when using a lot of spaces, as it's easier to accurately enter:

```
PRINT STRING$(10," ")
```

than:

```
PRINT "          "
```

though:

```
PRINT STRING$(10,CHR$(32))
```

is even clearer.

STR$

Turns a number or expression into a string. So if you've got a number 32 and you want it to be a string you use:

```
string$=STR$(32)
```

Notice that it is now a string. You can't do maths with it as you'll see if you try:

```
PRINT string$ *2
```

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What it offers the Electron user . . .

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Sending mailbox messages to other subscribers, whose numbers are rapidly growing, is the cheapest form of communication possible. You can send a message of any length to another mailbox for less than the cost of a first-class stamp. And it doesn't cost a penny more to send the same message to 500 different mailboxes! Even a message sent to a mailbox on the other side of the world only costs 30p.

The biggest bulletin board of them all

The number of bulletin boards is growing rapidly. The only snag is that the vast majority are single-user boards – which means lots of other people are also trying to make contact and all too often all you get is the engaged tone. But with the MicroLink bulletin board there is no limit to the number of people using it at the same time. And no limit to the number of categories that can be displayed on the board.

Give your micro mainframe power

With MicroLink your micro becomes a terminal linked directly to the Telecom Gold mainframe computer, and able to tap its tremendous power and versatility. Right away you'll be able to use giant number-crunching programs that can only run on a mainframe.

The mailbox that is always open

MicroLink is in operation 24 hours a day, every day. That means you can access your mailbox whenever you want, and from wherever you are . . . home, office, airport – even a hotel bedroom or golf club! No-one needs to know where you are when you send your message.

We're only a local phone call away

The majority of MicroLink subscribers can connect to our mainframe computer in London by making a local phone call. This is possible because they use British Telecom's PSS system, which has access points all over Britain. A local phone call is all you need, too, for direct access via MicroLink to all the other countries belonging to the international Dialcom system.

Telemessages – at a third off

The modern equivalent of the telegram is the telemessage. Send it before 10pm and delivery is guaranteed by first post the following day (except Sunday). The service was intended for people phoning their message to the operator, which costs £3.50 for 50 words. But you can now use it via MicroLink, for only £1.25 for up to 350 words! For an extra 65p your message can be delivered in an attractive greetings card.

Go teleshopping on your micro

With MicroLink you can study the British Rail timetable – and then buy your ticket in advance. You can book theatre tickets. And even order a bouquet of flowers. It's all part of the tele-shopping revolution!

Send and receive telex messages

With MicroLink you can turn your micro into a telex machine, and can send and receive telex messages of any length. You will be able to communicate directly to 96,000 telex subscribers in the UK, 1¼ million worldwide – and even with ships at sea via the telex satellite network. Business people can now send and receive telexes after office hours, from home or when travelling.

What does it all cost?

Considering all the services you have on tap, MicroLink is remarkably inexpensive. You pay a once-only registration fee of £5, and then a standing charge of just £3 a month. On-line costs are 3.5p a minute (between 7pm and 8am) or 11p a minute during office hours. There is an additional 2.5p a minute PSS charge if you are calling from outside the 01- London call area. Charges for telex, telemessages and storage of files are given on the next page.

How much it costs to use MicroLink

Initial registration fee: £5.

Standing charge: £3 per calendar month or part.

Connect charge: 3.5p per minute or part – cheap rate; 11p per minute or part – standard rate.
Applicable for duration of connection to the Service. Minimum charge: 1 minute.
Cheap rate is from 7pm to 8am, Monday to Friday, all day Saturday and Sunday and public holidays; Standard rate is from 8am to 7pm, Monday to Friday, excluding public holidays.

Filing charge: 20p per unit of 2,048 characters per month.
Applicable for storage of information, such as telex, short codes and mail files. The number of units used is an average calculated by reference to a daily sample.

Information Databases: Various charges.
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MicroLink PSS service: 2.5p per minute or part (300 baud); 3p per minute or part (1200/75 baud).
Only applies to users outside the 01-London call area.

Telex registration: £10.

Outgoing telex: 5.5p per 100 characters (UK); 11p per 100 (Europe); 18p per 100 (N. America); £1.25 per 400 (Rest of world); £2.75 per 400 (Ships at sea).
Deferred messages sent on the night service are subject to a 10 per cent discount.

Incoming telex: 50p for each correctly addressed telex delivered to your mailbox. Obtaining a mailbox reference from the sender incurs a further charge of 50p.
It is not possible to deliver a telex without a mailbox reference. If a telex is received without a mailbox reference the sender will be advised of non-delivery and asked to provide a mailbox address.
Each user validated for telex and using the facility will incur a charge of 6 storage units a month. Further storage charges could be incurred depending on the amount of telex storage and the use made of short code and message file facilities.

Telemessages: £1.25 for up to 350 words.
Telemessages can be sent with an illustrated greetings card for 65p extra.

Radiopaging: No charge.
If you have a BT Radiopager you can be paged automatically whenever a message is waiting in your mailbox.

International Mail: For the first 2,048 characters – 20p to Germany and Denmark; 30p to USA, Australia, Canada, Singapore, Hong Kong and Israel. For additional 1,024 characters – 10p; 15p.
These charges relate to the transmission of information by the Dialcom service to other Dialcom services outside the UK and the Isle of Man. Multiple copies to addresses on the same system host incur only one transmission charge.

Billing and Payment: All charges quoted are exclusive of VAT. Currently all bills are rendered monthly.

Software over the telephone

MicroLink is setting up a central store of software programs which you'll be able to download directly into your micro. The range will include games, utilities, educational and business programs, and will cover all the most popular makes of micros.

Talk to the world – by satellite

MicroLink is part of the international Dialcom network. In the USA, Australia and a growing number of other countries there are many thousands of users with electronic mailboxes just like yours. You can contact them just as easily as you do users in Britain – the only difference is that the messages from your keyboard go speeding around the world via satellite.

What you need to access MicroLink

You must have three things in order to use MicroLink: a computer (it can be any make of micro, hand-held device or even an electronic typewriter provided it has communications facilities), a modem (it can be a simple Prestel type using 1200/75 baud, or a more sophisticated one operating at 300/300 or 1200/1200 baud), and appropriate communications software.

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I/We hereby apply to join MicroLink

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(✓) ☐ I also wish to use Telex. I authorise you to charge an additional £10 to my initial bill for validation.

☐ I confirm that I am over 18 years of age.

✓ I confirm that I accept the terms and conditions for the time being in force.

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Date _____

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Name ☐☐☐

Give the bricklayer his marching orders

ROBIN NIXON presents an entertaining teaching aid for young children

MARCHING Order is designed as an aid to teaching simple numeracy and ordering of numbers between 1 and 9.

The program is in two sections. In the first the pupil is shown a group of numbers which light up in turn.

As each number appears the pupil must press the Spacebar the same number of times. For each press a brick will appear above the number.

Delete can be used if too many bricks are chosen and Return confirms selection.

In the second section the pupil must place the numbers in the correct order to enable a man to march up the bricks.

To arrange the bricks in the correct order the pupil presses the Spacebar until a man appears under the lowest number. The bricks above this number then re-position themselves at the bottom of the screen when Return is pressed.

When all the bricks have been re-positioned in the correct order the pupil is rewarded with a short animated sequence.

At the end of each game the selection menu is re-displayed so that you can change the level of difficulty should you wish to do so.

Marching Order listing

```
  100 REM********************
  110 REM*                  *
  120 REM* MARCHING ORDER *
  130 REM*                  *
  140 REM* By Robin Nixon *
  150 REM*  (c) Electron  *
  160 REM*      User      *
  170 REM*                  *
  180 REM********************
  190 REM
  200 IF PAGE=&E00 THEN GOT
O 240
  210 *KEY0"CLS:*FX3,2|M*T.
|MFORIX=PAGE TO TOP STEP4:!
(&E00+IX-PAGE)=!IX:NEXT:PAG
E=&E00|MOLD|MRUN|M"
  220 *FX138,0,128
  230 END
  240 *FX3,0
  250 *FX16
  260 MODE2:VDU23;8202;0;0;
0;19,0,5,0,0,0,19,4,6,0,0,0
:PROCinitdouble:PROCtitle
  270 LDX=1:DIM BX(9),CX(9)
:VDU 23,241,255,255,255,255
,255,255,255,255,23,242,56,
56,146,124,16,40,40,40:REPE
ATUNTILINKEY(-99)=0:*FX20
  280 MODE1:VDU23;8202;0;0;
0;:PROCinstructions:REPEAT:
MODE1:VDU23;8202;0;0;0;:PRO
Cselect:MODE 2:VDU23;8202;0
;0;0;:PROCbox:PROCcount:PRO
Corder:UNTIL 0
  290 END
  300 DEFPROCinitdouble:DIM
 AX(3):*FX20
  310 VDU 23,64,0,0,0,0,0,0,
0,0:ENDPROC
  320 DEFPROCdouble(XX,YX,C
X,SX,CH$):GCOL0,CX:CHX=ASC(
CH$)-64:FOR Y1X=1 TO 0:FOR
X1X=7 TO 0 STEP -1:IF ?(&BF
F+CHX*8+Y1X) AND 2^X1X PROC
square
  330 NEXT X1X:NEXT Y1X:END
PROC
  340 DEFPROCsquare:MOVE XX
+(7-X1X)*SX,YX-Y1X*SX:MOVE
XX+(7-X1X)*SX+SX,YX-Y1X*SX:
PLOT 85,XX+(7-X1X)*SX,YX-Y1
X*SX-SX:PLOT 85,XX+(7-X1X)*
SX+SX,YX-Y1X*SX-SX:ENDPROC
  350 DEFPROCtitle:PROCback
ground:A$="MARCHING":FOR NX
=0 TO LEN(A$)-1:PROCdouble(
NX*160+12,1000,NX MOD 4+1,1
6,MID$(A$,NX+1,1)):NEXT:A$=
"ORDER":FOR NX=0 TO LEN(A$)
-1:PROCdouble(NX*160+260,82
0,NX MOD 4+1,16,MID$(A$,NX+
1,1)):NEXT
  360 PROCreveal:ENDPROC
  370 DEFPROCbackground:FOR
 XX=0 TO 15:VDU 19,XX,XX-8,
0,0,0:NEXT:FOR XX=6 TO 7:VD
U 19,XX,0,0,0,0:NEXT:CX=5:F
OR XX=640 TO 0 STEP -8:GCOL
 0,CX:CX=CX+1:IF CX=8 CX=5
  380 MOVE XX,0:DRAW 1280-X
X,639:MOVE XX,639:DRAW 1280
-XX,0:NEXT:FOR YX=320 TO 4
STEP -4:GCOL 0,CX:CX=CX+1:I
F CX=8 CX=5
  390 MOVE 0,YX:DRAW 1279,6
40-YX:MOVE 1279,YX:DRAW 0,6
40-YX:NEXT:ENDPROC
  400 DEFPROCreveal:GCOL1,0
:FOR YX=640 TO 0 STEP -4:MO
VE 0,YX:DRAW 1279,YX:NEXT:C
OLOUR 4:VDU 31,3,13:PRINT"B
y Robin Nixon":COLOUR 1:VDU
 31,4,30:PRINT"Press  Space
":REPEAT:FOR XX=1 TO 3:OSCL
I"FX19":ON XX GOTO 410,420,
430
  410 VDU19,13,1,0,0,0,19,1
4,3,0,0,0,19,15,4,0,0,0:GOT
O440
  420 VDU19,13,4,0,0,0,19,1
4,1,0,0,0,19,15,3,0,0,0:GOT
O440
  430 VDU19,13,3,0,0,0,19,1
4,4,0,0,0,19,15,1,0,0,0
  440 FORYX=1 TO 50:NEXT YX
,XX:UNTILINKEY(-99):ENDPROC
  450 DEFPROCheader:*FX15
  460 CLS:VDU 31,12,0:COLOU
R 3:COLOUR 129:PRINT"MARCHI
NG  ORDER":ENDPROC
  470 DEFPROCinstructions:P
ROCheader
  480 COLOUR128:COLOUR2:PRI
NT''''"Marching Order is de
signed as an aid to"''"teach
ing simple numeracy and ord
ering"''"of numbers between
1 & 9."'''':COLOUR 3:PRINT"T
he program is in two sectio
ns. In the"''"first the pupi
l is shown a group ";
  490 PRINT"of"''"numbers wh
ich flash in turn. As each"
''"number flashes the pupil
```

→

Marching Order listing

From Page 41

```
aust press the"''"Space Bar
 the corresponding number of
 "''"times. For each press a
brick will"''"appear above t
he number. ";
  500  PRINT"Delete can be"
''"used if too many bricks a
re chosen and"''"Return ente
rs a selection."'''':COLOUR
 1:PRINT"In the second secti
on the pupil aust"''"place t
hese numbers in the correct
 "''"order to enable a man to
 march up"
  510 PRINT"the bricks.":VD
U 31,14,31:COLOUR 1:COLOUR
 130:PRINT"PRESS SPACE";:REP
EATUNTILGET=32:COLOUR 128
  520 PROCheader:COLOUR 128
:COLOUR 2:PRINT'''''"To arra
nge the columns of bricks i
n the"''"correct order the p
upil presses the"''"Space Ba
r until a man appears under
 the"''"lowest number. the b
ricks above this"
  530  PRINT"number then re
-position themselves at"''"t
he bottom of the screen whe
n Return is"''"pressed."''':
COLOUR 3:PRINT"When all the
 bricks have been"''"re-posi
tioned in the correct order
 the"''"pupil is rewarded wi
th a short animated"
  540 PRINT"sequence."''':C
OLOUR 1:PRINT"At the end of
 each 'game' the difficulty
";"selection menu is re-dis
played to allow"''"the level
 to be changed."
  550 VDU 31,14,31:COLOUR 1
:COLOUR 130:PRINT"PRESS SPA
CE";:REPEATUNTILGET=32:REPE
ATUNTILINKEY(-99)=0:ENDPROC
  560 DEFPROCbox
  570 VDU23,240,255,213,171
,213,171,213,171,255:VDU 28
,0,30,19,0:COLOUR129:CLS:VD
U26:COLOUR 2:COLOUR133:PRIN
TSTRING$(20,CHR$240);:FOR Y
%=1 TO 29:VDU 31,0,Y%:PRINT
CHR$240;:VDU31,19,Y%:PRINTC
HR$240;:NEXT:PRINTSTRING$(2
0,CHR$240);:ENDPROC
  580 DATA "E Easy      1-3
"
  590 DATA "A Average   1-5
"
  600 DATA "H Hard      1-7
"
  610 DATA "V Very hard 1-9
"
  620 DATA "I Instructions
"
  630 DEFPROCselect
  640 COLOUR 128:PROCheader
:COLOUR 2:VDU 31,1,18:PRINT
"Press E,A,H,V or I then Sp
ace to play"
  650 RESTORE 580:FOR X%=1
TO 5:READ A$:IF LD%=X% COLO
UR 1:COLOUR 135 ELSE COLOUR
 7:COLOUR 128
  660 *FX15,1
  670 VDU 31,12,X%*2+3:PRIN
TA$;:NEXT:REPEATI%=INSTR("E
AHVI ",GET$):UNTILI%:SOUND
1,-8,150,1:IF I%=5 PROCinst
ructions:GOTO 640 ELSE IF I
%=6 REPEATUNTILINKEY(-99)=0
:ENDPROC ELSE LD%=I%:GOTO 6
50
  680 DEFPROCcount:LL%=LD%+
2+1:FOR X%=1 TO LL%:B%(X%)=
X%:NEXT:FOR X%=1 TO LL%+2:R
1%=RND(LL%):R2%=RND(LL%):R3
%=B%(R1%):B%(R1%)=B%(R2%):B
%(R2%)=R3%:NEXT:COLOUR 4:CO
LOUR 129:FOR X%=1 TO LL%:VD
U31 (20-LL%)/2+X%-1,14:PRIN
T;B%(X%);:NEXT
  690 LL1%=(20-LL%)/2-1:FOR
 X%=1 TO LL%:COLOUR 2:COLOU
R 133:VDU 31,LL1%+X%,14,B%(
X%)+48
  700 Z%=0:REPEAT
  710 REPEAT UNTIL INKEY(-9
9) OR INKEY(-74) OR INKEY(-
98):IF INKEY(-74) SOUND 1,-
4,60,1
  720 IF INKEY(-99) AND Z%<
9 Z%=Z%+1:FOR J%=1 TO 14-Z%
:PROCbrick(LL1%+X%,J%):PROC
wait:PROCerase(LL1%+X%,J%):
NEXT:PROCbrick(LL1%+X%,J%-1
)
  730 IF INKEY(-98) AND Z%>
0 FOR J%=14-Z% TO 1 STEP -1
:PROCbrick(LL1%+X%,J%):PROC
wait:PROCerase(LL1%+X%,J%):
NEXT:Z%=Z%-1
  740 REPEATUNTIL INKEY(-99
)=0 AND INKEY(-98)=0
  750 UNTIL INKEY(-74):IF Z
%<>B%(X%) FORJ%=1 TO 13:PRO
Cerase(LL1%+X%,J%):NEXT:GOT
O700
  760 COLOUR 4:COLOUR 129:V
DU 31,(20-LL%)/2+X%-1,14,B%
(X%)+48
  770 NEXT:ENDPROC
  780 DEFPROCwait:ENDPROC
  790 DEFPROCbrick(X1%,X2%)
:SOUND 1,-4,X1%*5+150-X2%*1
0,1:COLOUR 0:COLOUR 134:VDU
 31,X1%,X2%,240:ENDPROC
  800 DEFPROCerase(X1%,X2%)
:COLOUR 1:VDU 31,X1%,X2%,24
1:ENDPROC
  810 DEFPROCorder:COLOUR 1
:VDU 31,0,29,241:FOR X%=1 T
O 5000:NEXT:FOR X%=0 TO LL1
%-1:COLOUR 0:VDU 31,X%,29,2
42:FORY%=1 TO 500:NEXT:COLO
UR 1:VDU 31,X%,29,241:NEXT:
COLOUR 0:VDU 31,X%,29,242
  820 FOR X%=1 TO 9:C%(X%)=
0:NEXT
  830 Z%=0:X%=1:N%=1
  840 REPEAT
  850 REPEAT
  860 REPEAT:IF C%(X%)=1 CO
LOUR 1:VDU 31,LL1%+X%,15,24
1:X%=X%+1
  870 IF X%>LL% X%=1
  880 UNTILC%(X%)=0
  890 COLOUR 6:COLOUR 129:V
DU 31,LL1%+X%,15,242:REPEAT
UNTILINKEY(-99)=0:REPEATUNT
ILINKEY(-99) OR INKEY(-74):
SOUND 1,-8,150,1:IFINKEY(-9
9) COLOUR 1:VDU 31,LL1%+X%,
15,241:X%=X%+1:GOTO 860
  900 UNTILINKEY(-74):IF B%
(X%)<>N% GOTO850
  910 FOR Z%=B%(X%) TO 1 ST
EP-1:FOR J%=14-Z% TO 1 STEP
-1:PROCbrick(LL1%+X%,J%):PR
OCwait:PROCerase(LL1%+X%,J%
):NEXT:FOR J%=LL1%+X% TO 18
:PROCbrick(J%,1):PROCwait:P
ROCerase(J%,1):NEXT
  920 FOR J%=1 TO 16:PROCbr
ick(18,J%):PROCwait:PROCera
se(18,J%):NEXT:FOR J%=18 TO
 LL1%+B%(X%) STEP -1:PROCbr
ick(J%,16):PROCwait:PROCera
se(J%,16):NEXT
  930 FOR J%=16 TO 20-(B%(X
%)-Z%):PROCbrick(LL1%+B%(X%
),J%):PROCwait:PROCerase(LL
1%+B%(X%),J%):NEXT:PROCbric
k(LL1%+B%(X%),J%):NEXT:C%(X
%)=1:N%=N%+1:UNTIL N%=LL%+1
  940 COLOUR 4:COLOUR 131:F
ORJ%=LL1%+B%(X%)+1 TO 18:VD
U 31,J%,38-(B%(X%)-Z%),240:
FOR L%=1 TO 3:PROCwait:NEXT
:NEXT
  950 N%=29:COLOUR 129:FORJ
%=LL1% TO LL1%+B%(X%):COLOU
R 0:VDU 31,J%,N%,242:FOR L%
=1 TO 3:PROCwait:NEXT:COLOU
R 1:VDU 31,J%,N%,241:N%=N%-
1:NEXT:COLOUR 0:VDU 31,J%,N
%+1,242:COLOUR 1
  960 VDU 31,19,29-(B%(X%)-
Z%),241:FORL%=1 TO 5000:NEX
T:FORJ%=LL1%+B%(X%)+1 TO 19
:COLOUR 0:VDU 31,J%,29-(B%(
X%)-Z%),242:FOR L%=1 TO 3:P
ROCwait:NEXT:COLOUR 1:VDU 3
1,J%,29-(B%(X%)-Z%),241:NEX
T:COLOUR 0:COLOUR 129
  970 VDU 31,19,29-(B%(X%)-
Z%),242:FORX%=0 TO 5000 STE
P 129:VDU 19,RND(7),RND(7),
0,0,0,19,RND(7),RND(7),0,0,
0:SOUND 1,-8,X%,1:NEXT:VDU2
0:FORX%=1 TO 10000:NEXT:END
PROC
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

Off into the sunset – with a blast

YOU may remember my asking in November's column whether anyone had managed to get out of the repository in *Classic Adventure.*

Well H. Bastien has written in to say how it can be done, thus earning himself a copy of Pettigrew's Diary.

Go to the second room of the repository and get the black rod. Take it to the first room and drop it.

When you are back in the second room type in BLAST. Some elves will carry you off into the sunset.

Neither of us can figure out why this should work, but it does.

This is obviously not the end of the game as it can be done with only 14 treasures. Has anyone managed to solve it yet?

Peter Bailey and Ian Horsham say that the following BBC games work on the Electron – ***Escape from Pulsar 7, Ten Little Indians*** and ***Secret Mission.***

Brian Rodwell wants to know if I have considered writing a book of hints and tips for frustrated adventurers. Does anyone else think this would be a good idea?

R. Henderson has sent in a tip for ***Adventure.*** He says that it is easy to press the Escape key by accident and that typing *FX229, 1 will disable it.

This is obviously a good tip for any program that doesn't disable the Escape key.

Paul Campbell wants to know whether ***Terrormolinas*** from Melbourne House is available for the Electron. The version released is suitable for both the BBC Micro and the Electron.

Several people have written in over the last couple of months about Rog Frost's review of ***Greedy Dwarf.***

Lou Carey doesn't agree with Rog and writes that he finds the game slow and awkward to play.

Martin Beint, on the other hand, agrees with Rog and goes on to say that it was this game that first got him hooked on adventures.

The whole point of a review is to give readers a critical, informed, but above all fair opinion about a piece of software.

However it is still one person's opinion, and as such is not going to please everybody.

Stuart Kelly and Geoff Larsen both feature in the Hall of Fame this month. Stuart, judging by his 52,680 high score on ***Snapper,*** is as much at home with arcade games as adventures, and Geoff is an ex-Spectrum and ZX-81 adventurer who has now bought an Electron and is avidly devouring the games available.

FEEDBACK

J. Scott writes, following Helen William's problems with ***Manic Mole,*** that she should leave out line 1070, which stops the screen becoming invisible and that leaving out line 1250 stops the girders melting in screen 4.

Matthew Pyecroft has written in to answer Carl Marlow's problem with ***Fighter Pilot.*** Apparently accelerating and pressing the UP key works 50 per cent of the time, and if this fails he can always press Caps Lock and invoke the automatic landing approach option.

Matthew goes on to give some tips for ***Crown Jewels.*** There is no Telecom Tower location, use TORCH ON in the Chamber of Horrors and you cannot attract the attention of the policeman or tower guard.

Lou Carey gives fuller information on the toad poisoning in ***Galadriel in Distress:***

- To get the toad out of the pond you must examine the cake to get the fly and then FEED FLY TO TOAD.
- To find the antidote to the toad poisoning you must examine the pond and pull the plug. Once the pond has drained you should examine it again to find the bottle. If you examine the bottle and the goblet you will find they both have writing on. Take both of them to the loremaster for deciphering.

The secret is that both are poison and that to nullify them you have to drink from both at the same time. Try DRINK FROM BOTTLE AND GOBLET.

CORNER PROBLEM

Before we look at some answers to readers problems, I have had a couple of letters recently that have caused me to ask those of you who write in to make sure that you are precise about the help you want and the way you ask for it.

One letter from a reader in Northants proved to be mainly illegible. Another asked for help with five adventures but didn't tell me where he was stuck, and yet another asked me if I could help but neglected to mention the adventure.

I welcome letters from anybody, but, please, if you have a question, make sure you give me as much information as possible.

Tony Bevan asks for help with ***Repton.*** He wants to know all the passwords and threatens to throw the game away if I don't tell him.

The passwords are Chameleon, Terrapin,

From Page 43

Sidewinder, Gecko, Python, Salamander, Iguana, Cuttlefish, Octopus, Giant Clam and The Kraken.

Incidently, I managed to solve all the screens in this game but I still can't believe it's possible to do so without losing a life.

David McGloin has written in with questions about three adventures. The stars in ***Philosophers Quest*** are just an indication of nearby danger and can otherwise be ignored.

In the ***Eye of Zoltan*** the gloves are hidden in the wizard's bedroom. You use the password in the secret passage with the keys to get out of the castle.

In ***Spiderman*** use the computer to start the presses.

G.B. Lambert wants to know where the orb is in ***Crown Jewels.*** I haven't seen the game yet, but as far as I know the orb is inside one of the waxworks. Use the matches and you should find it.

Paul Campbell has found that he can't get into the hole in the side of the chasm in ***Greedy Dwarf.*** Use the chain and choose the right direction.

Michael Peters can't get out of the pit or the tank in ***Mystery Fun House.*** Use the trampoline and give the mermaid something for her hair and then drain the water out.

Philip Stout has some questions about ***Pettigrew's Diary.*** *How do I get into the underground station?* You can't!

What do I do with the Japanese tourists? You have to do two things. When you meet the tourist on his own you should take his map and read it.

Later on you will meet a party of tourists. You will get some money and a camera from them if you tell them where you saw their friend.

Martin Beint has found everything except the pirate's chest in ***Classic Adventure.*** From the west end of the hall of mist go: S, E, S, S, S, N, E, E, NW.

Nick Southgate wants to know how to dock in ***Super Agent Flint.*** You don't! But if you have the suit and helmet and can insert the right disc into the computer you will be able to blast off and finish the game.

Nick also wants to know how to get past the slug in ***Blue Dragon.*** I managed to complete the game without finding a way past it, or into the cave, so I assume you can't do either.

Andrew Spratling can't find the time crystal in ***Stranded.*** Assuming you have already found the radiation suit, you should go S,E,E,E,S,S from the control room of the Tardis.

SOS

Michael Peters would like to know how to get back to the ship once you have the treasures and how to translate the writing on the boulder in ***Strange Odessey.***

R. Henderson is having problems with Alligata's ***Nightworld.*** He says the instructions are very vague and that he can't find the secret rooms and passages or replenish his energy.

Tony Haynes wants to know how to read the stone tablet on the river bed in ***Staff of Law.***

Martin Beint has the same problem as me in ***Five Stones of Anadon.*** Where is the cross to exorcise the ghost? Can anyone help us?

HALL OF FAME

Philosophers Quest – *Stuart Kelly*

The treasures: ruby, amulet, brass trophy, silver chain, ancient book, ivory tusk, gold tooth, jewelled platypus, treasure chest, filigree slipper, cheque, stuffed albatross.

Important locations: Curly passage, room full of holes, philosopher's room for contemplation, elephant's graveyard, whale's mouth, thin E-W corridor, octopus' room, sea cupboard, solicitor's office after dropping will, albatross room.

The dogs:

- Past the elephant's graveyard.
- Spot is in the bare cell past the danger room.
- Go to kennel room, get the dog and then go under the paint dropper to make it visible.

The danger room: JUMP NORTH, CRAWL NORTH, HOP SOUTH, RUN SOUTH.

The albatross: Go to the worker in the M.E. passages.

The octopus: Throw a bottle of ink.

The whale: Drop the driftwood and set fire to it by the gold tooth.

The portcullis: Rub amulet.

The mouse: Get the gorgonzola cheese if you are wearing a gas mask.

The elephant: Carry the mouse.

Sorcerer of Claymogue Castle – *Geoff Larsen*

M. Tiplady has not solved as much of the game as he thinks. The answer to his problems are:

Stars are stored inside a tree in the forest.

There are two odd feelings. One as you age and one as you grow younger. The two must balance each other. The spell of Methuselah makes you grow old and the Fountain of Youth has the opposite effect. If the effect of one outweighs the other then you die and the game is over. A DRY towel wipes away the water droplets of youth.

You do not open the loft in the ballroom. The loft is reached by casting the correct spell while standing on the fallen chandelier.

The stone door is opened by casting the seed spell.

Invisibility is the key to entering the dragon's lair.

The oak door does not need to be opened.

In response to Julian Holden and Matthew Hall's problems:

To get through the stone door you need the seed spell. To enter the castle without using the spell, enter the moat and HOLD BREATH, SWIM DOWN, SWIM DOWN, SWIM EAST.

To get the can from the battlements you must throw the firebrick. A helping hand to do this can be acquired across the lava through the stone door.

Gremlins – *Geoff Larsen*

The electric drill is used to drill a hole in a metal plate which has been welded across the smashed vent in the hardware department.

The hacksaw is used to cut two pipes. One pipe is behind the bar in Dorry's tavern and the other is attached to the gas bottle.

In the pub K. and D. Harper should go behind the bar.

The mail box can be cut up into metal pipes using the welding torch, once you have coaxed Stripe, the worst of the gremlins, out of the box.

The film show at the cinema is handy for keeping the gremlins occupied while exploring the rest of the town.

Giles Harris should examine the counter to get the tape that will enable him to attach the gas bottle pipe to the whole in the metal pipe.

Circus – *Geoff Larsen*

In answer to David Anderson's problems:

Repair the generator and then you can syphon out the petrol with the snorkel.

You need a bar to prise open the door when trying to get into the wagon. The bar is reached by walking across the tightrope. Some soft shoes found inside the chest will help here, and if you can't open the chest you will need to give it a good kick.

MATHS WORKOUT

MIKE BIBBY continues his exposé on how the Electron does its sums

EOR's a way to spot who's telling the Exclusive truth

IN the last article we looked at the AND and OR operations on binary numbers – logical operations, as they are known. These were simply rules for combining numbers bit by bit. We shall continue our exploration this month with a look at the EOR operation.

EOR stands for Exclusive OR – sometimes people call it XOR. Either way it's the same thing. EOR is a variant on the way we normally use the term OR.

For example, if I say:
Mike OR Pete wears glasses
this is true if Mike wears glasses, OR Pete wears glasses, OR both Mike *and* Pete wear glasses.

Now it's this last case of OR we're interested in, where they both wear glasses. EOR works just like OR up to this point. However, EOR does not "allow" both of them to wear glasses. Either one does, or the other, but not both.

To put it another way, the one who wears the glasses does so *exclusively*.

If both are wearing glasses then while:
Mike OR Pete wears glasses
would be true,
Mike EOR Pete wears glasses
would be a downright lie!

We could signify that a statement is true with the letter T, and use F for false. At school our teachers used ticks for truth and crosses for false. Since we're using computers, though, we'll use numbers: 1 will denote true and 0 will denote false. We've chosen 1 and 0 because they fit in so well with the binary system.

So, in the above example, if Mike has glasses we can give Mike the value 1. If Pete hasn't glasses we can give Pete the value 0.

Table I shows the idea, applied to each combination of spectacle user. The ones and zeros are known as truth values, states or conditions.

As you can see, there are four possible cases as far as Mike and Pete wearing glasses are concerned: neither can wear them as in case 1, where both Mike and Pete has 0 value. Then again, Pete may wear them (1) whereas Mike does not (0), case 2, and so on.

If you look carefully at the numbers involved in all four cases, you see that we've got four pairs of bits we can combine.

Each pair of bits is made up of the "truth bit" for Mike and the "truth bit" for Pete.

What I've done in Table II is to combine these pairs for all four cases in accordance with our OR rules. We've stored the result in a third column.

We call such a table a Truth Table. In this case, it's the truth table for OR. We can use it to work out the result for any OR combination of two bits.

All we have to do is to find the row that starts with the two bit values we're combining and then look in the third

→

	Wears glasses		
	Mike	Pete	
Case 1	0	0	neither wears glasses
Case 2	0	1	Pete wears glasses
Case 3	1	0	Mike wears glasses
Case 4	1	1	Both wear glasses

Table I: Truth values

Mike wears glasses	Pete wears glasses	Mike OR Pete wears glasses
0	0	0
0	1	1
1	0	1
1	1	1

Table II: OR truth table

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column for the result.

Table III shows a similar table for:

Mike AND Pete wear glasses

Again the first two columns are identical, covering all four possible cases. The third column combines them according to the AND rules.

Look again at Table II. This corresponds in a sense to our binary rule for OR: you get a 1 if either or both bits you combine contain a 1.

However if when talking about Mike and Pete you mean OR in the exclusive sense, EOR, then the combination of Mike wearing glasses and Pete also wearing glasses would have to be false.

This is because EOR means either one or the other wears glasses, but not both – it's *exclusively* one or the other.

If we do mean EOR in this exclusive sense we'd write our statement about them as:

Mike EOR Pete wears glasses

Its Truth table is given in Table IV:

If you look at each case, you'll see that the only time Mike EOR Pete is true is when either one or the other wears glasses, but not both (or neither).

More formally, if both bits are 0, or both bits are 1 the result is 0. If either is 1 and the other is 0 the result is 1.

To put it another way, if the bits are identical the result is 0, otherwise the result is 1.

Let's have a look at how we EOR binary pairs of numbers. It's the same as for OR and AND – just apply the rules for EORing to each pair of bits in succession. For example:

```
      %10110110
EOR   %11100101
gives %01010011
```

Take a look at what happens when you EOR a number with zero:

```
      %10110110
EOR   %00000000
gives %10110110
```

that is, when you EOR a number with zero it leaves that number unchanged. Also something interesting happens when you EOR a number with itself:

```
      %10110110
EOR   %10110110
gives %00000000
```

Whenever you EOR a number with itself, the result is zero. This is as it should be: remember, when you EOR two identical bits the result is zero.

Now EOR has a property which makes it quite useful – let's look what happens when we take a number, EOR it with a second number and then go on to EOR the result once more with that second number.

```
First number              %10101101
Second number EOR         %01101000
Result                    %11000101
Second number EOR         %01101000
Final result              %10101101
```

As you can see, the first number has magically re-appeared! This always happens when you EOR twice with the same number as, in a sense, the two EORings cancel each other out.

Table V summarises the process for all four possible pairs of one-bit numbers.

As you can see, for all the cases the final resulting bit (when the first bit has been EORed twice with the second) is identical to the first bit.

Another way to think of it is that we are doing:

first number EOR second number EOR second number

Taking the underlined part first, we've already seen that any number EORed with itself gives a zero result. So what we're really doing is:

first number EOR 0

which, as we've also seen, must leave just the first number, since EORing with zero leaves a number unchanged.

All this may seem rather abstruse, but actually it's quite useful. In fact we tend to use AND, OR and EOR quite often in graphics, particularly in animation.

To simulate movement we frequently print something on the screen, then after leaving it there for a while to register on the eye, we blank it out and print it in a new position and so on.

Sometimes we blank the character out by printing it again in the same place but in the background colour.

We can, however, use EOR. If we use EOR to place our character on the screen – never mind exactly how for the moment – when it comes to wanting rid of it, we can just repeat ourselves.

That is, we just EOR the character on again. As we've seen, the effect of two EORs is to cancel each other out. In this case, they cancel out to the original background – and the character disappears.

Don't worry too much about the details, I just want to convey the general idea.

The point is, logical operators, as AND, OR and EOR are known, can be invaluable to both the Basic and machine code programmer.

● *Next time we'll continue our series with a brief look at the idea of masks.*

> *'We tend to use AND, OR and EOR quite often, particularly in animation'*

Mike wears glasses	Pete wears glasses	Mike AND Pete wear glasses
0	0	0
0	1	0
1	0	0
1	1	1

Table III: AND truth table

Mike wears glasses	Pete Wears glasses	Mike EOR Pete wears glasses
0	0	0
0	1	1
1	0	1
1	1	0

Table IV: EOR truth table

First bit	Second bit	Result 1st EOR	Second bit again	Result 2nd EOR
0	0	0	0	0
0	1	1	1	0
1	0	1	0	1
1	1	0	1	1

Table V: Combined truth tables

Find and replace that string

Ever tried to find a particular string in a long, long listing? With this search utility by ROBIN NIXON your micro will do the chore for you

WHEN writing fairly long programs I often find that I'm not sure whether I've used a certain variable name before, or of the exact whereabouts of a particular procedure.

I also use very long variable names for the sake of clarity, which occasionally cause the dreaded No Room error.

For these reasons I wrote Find and Replace – which is really two programs rolled into one.

The first part, Find, will go through an entire Basic program highlighting any occurrences of the string being searched for.

The second part, Replace, replaces any occurrences of the search string with another string.

When called, Find and Replace prompts you with the question *FIND?* to which you enter the string you are looking for. You are then prompted with *REPLACE?*.

If you press Return at this point, Find and Replace will begin to search through the program without replacing anything. If, instead of pressing Return, you enter a string you are then prompted with the question *GLOBAL?*

If you answer yes to this, Find and Replace goes ahead and automatically changes every occurrence of the search string with the replace string. Otherwise each occurrence will be highlighted in turn and the computer will wait for you to type Y or N for whether or not you want to replace.

The way it works is really quite simple, although you coding is a little tricky. As you may know, in BBC Basic each program line is stored in a tokenised form.

This means that keywords such as FOR, NEXT and THEN each have a corresponding single character which is substituted for the keyword itself. This is done to make program execution easier and faster and to enable longer programs to be typed in.

Because the lines are tokenised it is not possible to compare a search string with sections of a program line because they are not in the same format. So immediately after you enter search or replace strings the utility tokenises them so that they are of the same format.

Next, the program takes each line in turn and checks whether or not the search string is contained in it – in much the same way as INSTR works. If so it records the number of times and where the matches occur.

Having done that, if you have not selected the Replace option each occurrence is highlighted while the program waits for a key press. This continues until the end of the program is reached or you press Escape.

If you have selected the Replace option the line is copied, bit by bit, into a buffer at &700 with each search string being substituted where required by a replace string.

The new line now held in &700 – which is the keyboard input buffer – is then entered into your program as if it had been typed in at the keyboard.

As it stands Find and Replace tucks itself in just under HIMEM in Mode 6. Therefore if you later change mode it will be wiped out. This is fine if you only need temporary use of the utility.

But if your Electron is cassette-based and you wish to keep Find and Replace resident in memory, the simplest thing to do would be to set PAGE to &1200 and then load Find and Replace by typing:

```
PAGE=&1200
LOAD "FINDREP"
```

assuming of course, that it has previously been saved as FINDREP. Then change the value of *START* in line 210 to &E00 and run the program.

If you have a disc-based Electron and want to keep the utility resident in memory – and don't mind losing use of the function keys – just change *START* to &900 and run the program.

In each of these cases the object code will be saved either to tape or disc as FR.

Whenever you need to use Find and Replace in the future *LOAD FR and, depending on the value *START* was set to when FR was assembled, type one of the following:

```
CALL &900
CALL &E00
CALL &5000
```

&900 is for disc users only, &E00 is if you wish to keep Find and Replace resident in memory and &5000 is the default if you don't change the listing.

When using this utility always ensure that you have saved the program you are working on as you may accidentally change something you don't wish to.

For example, if you changed all occurrences of IF to : you could not then change all occurrences of : to IF and still have a working program – you would then have no statement separators.

Also, if you have a fairly long line and start replacing small chunks of it with larger ones, it may end up longer than the maximum 255 characters allowed. In this case your line will finish up being garbled.

Full listing starts on Page 48

From Page 47

```
100 REM ******************
110 REM *                *
120 REM * FIND  REPLACE *
130 REM *                *
140 REM *  By  R.Nixon   *
150 REM *                *
160 REM * (c)  Electron *
170 REM *      User      *
180 REM *                *
190 REM ******************
200 REM
210 MODE 6:START=&5000
220 FOR PASS=0 TO 3 STEP3
230 P%=START
240 [
250 OPT PASS
260 \
270 .start
280 \
290 SEI
300 LDA &F4
310 CMP #10
320 BEQ basic
330 CMP #11
340 BEQ basic
350 PLA
360 PLA
370 \
380 .basic
390 \
400 LDA #10
410 STA &F4
420 STA &FE05
430 CLI
440 LDA #0
450 STA &6
460 LDA #80
470 STA &7
480 JSR &BFCF
490 EQUB 22
500 EQUB 6
510 EQUS "FIND & REPLACE"
520 EQUB 10
530 EQUB 10
540 EQUB 13
550 EQUS "Find? "
560 LDA #0
570 STA osword
580 JSR input
590 LDA #0
600 JSR token
610 LDA &600
620 CMP #13
630 BEQ start
640 JSR &BFCF
650 EQUB 13
660 EQUS "Replace? "
670 LDA #&40
680 STA osword
690 JSR input
700 LDA #0
710 STA &80
720 LDA &640
730 CMP #13
740 BEQ noglob
750 LDA #&40
760 JSR token
770 JSR &BFCF
780 EQUB 13
790 EQUS "Global? "
800 LDA #0
810 JSR &FFE0
820 BCC notesc1
830 JMP escape
840 \
850 .notesc1
860 \
870 JSR &FFEE
880 STA &80
890 \
900 .noglob
910 \
920 JSR &FFE7
930 JSR &FFE7
940 LDA &10
950 STA &74
960 LDA #0
970 STA &73
980 STA &7B
990 \
1000 .check
1010 \
1020 LDA &7B
1030 CMP #&FF
1040 BNE cont
1050 RTS
1060 \
1070 .cont
1080 \
1090 JSR incprog
1100 CMP #&FF
1110 BEQ alldone
1120 STA &82
1130 JSR incprog
1140 STA &81
1150 JSR incprog
1160 STA &83
1170 LDA &73
1180 STA &78
1190 LDA &74
1200 STA &79
1210 LDA #0
1220 STA &84
1230 STA &85
1240 STA &70
1250 STA &75
1260 STA &76
1270 STA &77
1280 LDA #1
1290 STA &89
1300 STA &86
1310 \
1320 .compare
1330 \
1340 INC &75
1350 JSR incprog
1360 STA &71
1370 LDY &70
1380 CMP &600,Y
1390 BNE nomatch
1400 CMP #13
1410 BEQ endline
1420 LDA &84
1430 BNE nocopy
1440 LDA &75
1450 STA &84
1460 \
1470 .nocopy
1480 \
1490 INC &70
1500 LDY &70
1510 LDA &600,Y
1520 CMP #13
1530 BEQ match
1540 JMP compare
1550 \
1560 .nomatch
1570 \
1580 LDA #0
1590 STA &84
1600 STA &70
1610 LDA &71
1620 CMP #13
1630 BEQ endline
1640 JMP compare
1650 \
1660 .match
1670 \
1680 INC &85
1690 LDY &85
1700 LDA &84
1710 STA &600,Y
1720 LDA &71
1730 CMP #13
1740 BEQ endline
1750 LDA #0
1760 STA &84
1770 STA &70
1780 JMP compare
1790 \
1800 .endline
1810 \
1820 LDA &85
1830 BNE display
1840 JMP check
1850 \
1860 .alldone
1870 \
1880 RTS
1890 \
1900 .display
1910 \
1920 LDA &81
1930 STA &2A
1940 LDA &82
1950 STA &2B
1960 JSR &9923
1970 \
1980 .dloop
1990 \
2000 LDA #1
2010 STA &76
2020 LDA &86
2030 LDY &89
2040 CMP &600,Y
2050 BEQ begin
2060 TAY
2070 LDA (&78),Y
2080 CMP #13
2090 BNE ptoken
2100 JMP gocheck
2110 \
2120 .ptoken
2130 \
2140 JSR &B50E
2150 LDY &77
2160 STA &700,Y
2170 INC &77
2180 INC &86
2190 JMP dloop
2200 \
2210 .find
2220 \
2230 LDA &640
2240 CMP #13
2250 BNE reprint
2260 JSR &FFE0
2270 BCC reprint
2280 JMP escape
2290 \
2300 .reprint
2310 \
2320 JSR restore
2330 LDY #&FF
2340 JSR dispfr
2350 JMP incap
2360 \
2370 .begin
2380 \
2390 LDA #0
```

```
2400 STA &76
2410 LDA &318
2420 STA &87
2430 LDA &319
2440 STA &88
2450 JSR inverse
2460 LDY #&FF
2470 JSR dispfr
2480 TYA
2490 CLC
2500 ADC &86
2510 STA &86
2520 JSR normal
2530 LDA #1
2540 STA &76
2550 LDA &640
2560 CMP #13
2570 BEQ find
2580 LDA &80
2590 CMP #ASC"Y"
2600 BEQ replace
2610 JSR &FFE0
2620 BCC notesc2
2630 JMP escape
2640 \
2650 .notesc2
2660 \
2670 CMP #ASC"Y"
2680 BNE find
2690 \
2700 .replace
2710 \
2720 JSR restore
2730 JSR inverse
2740 LDY #&3F
2750 JSR dispfr
2760 JSR normal
2770 LDA #&FF
2780 BIT &FF
2790 BPL incap
2800 JMP escape
2810 \
2820 .incap
2830 \
2840 SEC
2850 LDA &89
2860 SBC &85
2870 BCS noinc
2880 INC &89
2890 \
2900 .noinc
2910 \
2920 JMP dloop
2930 \
2940 .gocheck
2950 \
2960 LDA &640
2970 CMP #13
2980 BEQ chckfin
2990 LDY #40
3000 LDA #32
3010 \
3020 .spaces
3030 \
3040 JSR &FFEE
3050 DEY
3060 CPY #0
3070 BNE spaces
3080 LDA #13
3090 JSR &FFEE
3100 LDY &77
3110 LDA #13
3120 STA &700,Y
3130 LDA &82
3140 STA &2A
3150 LDA &83
3160 STA &2B
3170 LDY #1
3180 LDA (&73),Y
3190 STA &7B
3200 INY
3210 LDA (&73),Y
3220 STA &7A
3230 LDA &81
3240 STA &2A
3250 LDA &82
3260 STA &2B
3270 LDY #0
3280 JSR &BC8D
3290 LDA &7A
3300 STA &2A
3310 LDA &7B
3320 CMP #&FF
3330 BEQ chckfin
3340 STA &2B
3350 JSR &9970
3360 SEC
3370 LDA &3D
3380 SBC #3
3390 STA &73
3400 LDA &3E
3410 SBC #0
3420 STA &74
3430 JMP check
3440 \
3450 .chckfin
3460 \
3470 JSR &FFE7
3480 JMP check
3490 \
3500 .input
3510 \
3520 LDX #osword MOD &100
3530 LDY #osword DIV &100
3540 LDA #0
3550 JSR &FFF1
3560 LDA #&FF
3570 BIT &FF
3580 BPL disdone
3590 \
3600 .escape
3610 \
3620 BRK
3630 EQUB 17
3640 EQUB 10
3650 EQUB 13
3660 EQUB 7
3670 EQUS "Escape"
3680 EQUB 0
3690 \
3700 .osword
3710 \
3720 EQUB 0
3730 EQUB 6
3740 EQUB 64
3750 EQUB 32
3760 EQUB 128
3770 \
3780 .token
3790 \
3800 STA &37
3810 LDA #6
3820 STA &38
3830 JSR &8951
3840 RTS
3850 \
3860 .incprog
3870 \
3880 CLC
3890 LDA &73
3900 ADC #1
3910 STA &73
3920 LDA &74
3930 ADC #0
3940 STA &74
3950 LDY #0
3960 LDA (&73),Y
3970 RTS
3980 \
3990 .inverse
4000 \
4010 LDA #idat MOD &100
4020 JMP storvar
4030 \
4040 .normal
4050 \
4060 LDA #ndat MOD &100
4070 \
4080 .storvar
4090 \
4100 STA iloop+1
4110 LDY #0
4120 \
4130 .iloop
4140 \
4150 LDA idat,Y
4160 JSR &FFEE
4170 INY
4180 CPY #4
4190 BNE iloop
4200 RTS
4210 \
4220 .idat
4230 \
4240 EQUB 17
4250 EQUB 0
4260 EQUB 17
4270 EQUB 129
4280 \
4290 .ndat
4300 \
4310 EQUB 17
4320 EQUB 1
4330 EQUB 17
4340 EQUB 128
4350 \
4360 .dispfr
4370 \
4380 INY
4390 LDA &600,Y
4400 CMP #13
4410 BEQ disdone
4420 JSR &B50E
4430 LDA &76
4440 BEQ dispfr
4450 LDA &600,Y
4460 LDX &77
4470 STA &700,X
4480 INC &77
4490 JMP dispfr
4500 \
4510 .disdone
4520 \
4530 RTS
4540 \
4550 .restore
4560 \
4570 LDA #31
4580 JSR &FFEE
4590 LDA &87
4600 JSR &FFEE
4610 LDA &88
4620 JSR &FFEE
4630 RTS
4640 ]
4650 NEXT
4660 OSCLI("*SAVE FR "+STR
$~START+" "+STR$~P%)
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

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Educational Computing on the Electron

9 FULL LENGTH programs designed to stimulate, educate and entertain – both school and at home

The Micro User Education Special Volume I has now sold out But Volume 2 is still available

It contains nine full length programs written to the highest standards and each picked to combine educational worth with sheer enjoyment. The nine programs cover topics from early reading and simple sums to the rules of punctuation and angle estimation – and there's an excellent introductory database.

The magazine contains the complete listings of all the programs together with advice on how they can be adapted to cater for individual needs.

Fun Factors: *Arcade style factor learning.* ***Windmill:*** *Word, number and colour recognition.* ***Angler:*** *Angle estimation fun.* ***Spelldroid:*** *Learn to spell with our friendly robot.* ***Tortal:*** *Teach and test the rules of simple addition.* ***Discovery:*** *A strategy based phrase identification game.* ***Punctuation:*** *Test and teach the rules of punctuation.* ***Junior Database:*** *A comprehensive database for the young learner.* ***Chinese Takeaway:*** *Teach and test the rules of simple subtraction.*

Education Special Volume 2	
Magazine	£1.50
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Order on Page 61

MAKE IT A RED- OR BLUE, OR YELLOW- LETTER DAY

TREVOR ROBERTS starts a new series on Electron graphics

FOR a micro that's supposed to have 16 colours, the Electron's screen display is fairly drab when you switch on.

All you get when you type at the keyboard is white letters appearing on a black background.

Now inspired by the knowledge that although the Electron is in Mode 6 when you switch on there are several other modes available, you might want to try exploring these.

To change mode – and we'll deal with what that actually means later – you just type in MODE followed by the mode number you require and press Return.

There are seven different modes in all, ranging from Mode 0 to Mode 6 (the default mode). So by entering:

```
MODE 0
```

through to:

```
MODE 6
```

in turn we can explore each of their characteristics.

Again, it's a bit disappointing for those who want a bit of colour in their computing life. Although the appearance of the letters you type in and the number of characters per line and lines to a screen differ with each mode, the colours stay obstinately black and white. Or to be precise, white letters on a black background.

Figure I sums up the changes you can expect as you travel from mode to mode.

As you can see from the text column of Figure I, the number of lines of text you can display from top to bottom of the screen varies from mode to mode.

In Mode 1 there are 32 lines while in Mode 3 there are 25. In Mode 0 you can have a massive 80 characters on a line while in Modes 2 and 5 you can only have 20.

Now the second column of Figure I seems to indicate that some of the modes can have more than one colour. We're told that Modes 1 and 5 have four colours, while Mode 2 has sixteen. But if that's so, why, when we entered Mode 5 with:

```
MODE 5
```

did the letters appear in only black and white? What of the other two colours?

The answer is that the other two colours are there and ready to be used, but we haven't told the Electron we want to use them. Until we do, we are stuck with the colours established by the default condition.

You probably understand what is meant by a default condition. If you don't, don't worry, because you meet them all the time.

When you switch on your Electron or press Break, the micro starts up in Mode 6 (25 lines, each capable of holding 40 characters).

It has to start up in one mode or another, and the mode that is chosen is Mode 6. If you want another mode you have to use a MODE command to get to it.

Hence the term default condition, it's the mode you get by default. If you want another you have to tell the micro.

It's the same with the colours available when you enter a mode.

If you think about it, you only really need two, a foreground colour for the text and a background colour.

And the default colours picked by Acorn are black and white. The letters are white and the background black. These are the defaults.

If you want another pair of colours, such as black letters on a white background, or red letters on a yellow background, then you have to do something about it.

You have to change the default conditions so you get the shades of text and background that you want. And you do this using the COLOUR command.

Let's concentrate on Mode 5, which Figure I promises us has four colours and 32 lines of 20 rather chunky characters. Put the Electron into Mode 5 by entering:

```
MODE 5
```

and pressing Return.

As usual, the text is white on a black background. Now try entering:

```
COLOUR 1
```

and see what happens. Unless your Electron is very different from mine you should see that the prompt – > – is now red rather than white. Now try typing a few letters such as:

```
PRINT "It's a red letter day"
```

and you'll see now that the foreground or text colour is red.

So, when you're in Mode 5 the command COLOUR 1 ensures that any letters that appear on screen after the command are red. Now try the command:

```
COLOUR 2
```

and you'll see that the prompt on the next line is yellow. Further keyboard athletics should convince you that now the text colour is yellow.

A quick:

```
COLOUR 3
```

returns the Electron to producing white text on a black background.

The result of all this is that

→

Mode	Number of colours	Text		Memory used
		lines	char	
0	2	32	80	20k
1	4	32	40	20k
2	16	32	20	20k
3	2	25	80	16k
4	2	32	40	10k
5	4	32	20	10k
6	2	25	40	8k

Figure I: Electron modes

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now, unless you've cleared the screen or you've been so verbose that it's scrolled to make room for more text, you should have four colours on screen. They are white, red, yellow and black.

Lose one mark if you forgot about black. That's counted as a colour, even though it's a background colour. In fact you can get black text as you'll see – or rather not see – if you use:

```
COLOUR 0
```

The problem is that the black text merges into the black background, so you can't see what you're typing. Not a good idea!

The easy way out of this is to hit the Break key, which returns you to the default set-up, white text on a black background.

The drawback is that you're now in Mode 6, not Mode 5. Still:

```
MODE 5
```

will remedy that.

Now that we've seen how to change the foreground or text colours you might want to have a go at changing the background too.

This is easy if you remember the numbers you used with COLOUR to alter the foreground. All you do is add 128 to these numbers and the background turns to that colour.

So assuming that you're back in Mode 5 in the default black and white, try:

```
COLOUR 129
```

The result is that you should see a white prompt appear on small patch of red background. The new background colour is red and any letter printed on the screen will appear against a small patch of red. If you want the whole background to go to red just use CLS to clear the screen. Spectacular isn't it?

To get a yellow background you just use:

```
COLOUR 130
```

as 130 is 128+2. To get a white background:

```
COLOUR 131
```

is the command. However this isn't too bright an idea, as now you can't see the white letters against the white background.

Again, if you can't type in commands that you can't see, the Break key should help.

As you've probably guessed, the command COLOUR 128 has the black background re-emerging.

With this mastery of the colour command in Mode 5 we can now get the foreground/background combinations we wished for earlier.

For black letters on a white background:

```
COLOUR 0:COLOUR 131:CLS
```

should do the trick, while:

```
COLOUR 1:COLOUR 130:CLS
```

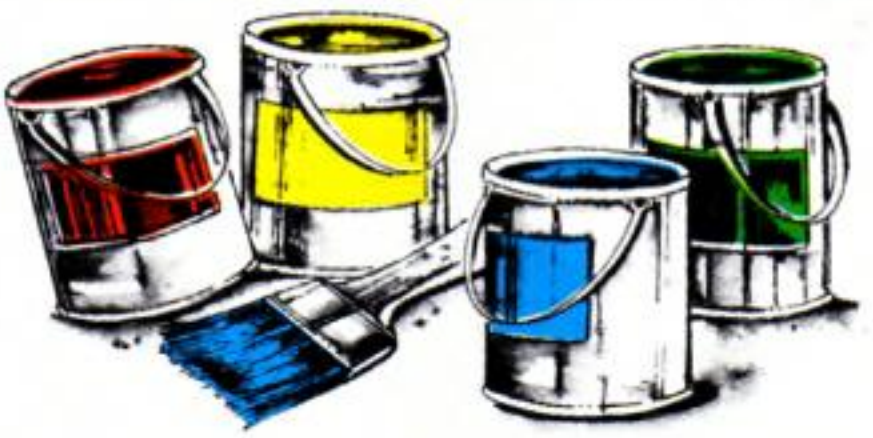
will provide red letters on a yellow background.

So we've four colours available in Mode 5 and the promise of Figure I has been fulfilled.

The colours are selected with a COLOUR command, each colour having a reference number.

Black is colour 0, red is 1, yellow is 2 and white is 3. Adding 128 to the number allows us to alter the background.

It seems simple and straightforward, and so it is. However there is more to the COLOUR command than meets the eye. The numbers that we use to refer to the colours in our COLOUR commands are known as logical colour numbers.



So far the logical colour number 0 has referred to black, the logical colour number 1 has meant red and so on.

When you think about it, this is a bit limited. What if you wanted green or blue letters on a background of magenta, cyan or even on flashing blue-yellow?

Can you get these colours? The answer is yes.

You can think of our familiar logical colour numbers as codes standing for colours.

When you enter Mode 5 the code number 0 stands for black, while 2 means yellow. Now this selection is one of the Electron's default conditions.

Although it's like that when you enter the mode it needn't be like that all the time. If you want, you could have code 0 referring to blue and code 3 referring to magenta, so:

```
COLOUR 0
```

would result in blue letters, while:

```
COLOUR 3
```

would give magenta text.

How we actually do that we'll leave to next time. The point to grasp is that the logical colours can be filled with other shades than the ones allocated by the Electron.

If you wished they could all be flashing yellow-blue, though that would be a bit silly.

If you have difficulty with the concept, just think of the logical colour numbers as being paint pots. When you enter Mode 5 you've got four of these paint pots numbered 0 to 3 that just happen to be filled with black, white, red and yellow paint.

You can change the paint in these pots if you want different colours, but you're only allowed four pots at one time.

Figure II shows the four logical colours with their default colours, along with some of the colours that could actually be used.

For the moment, however, stick with the default colours allocated to the four logical colours we're given in Mode 5.

Try out different combinations of foreground and background colours until the COLOUR command gets to be second nature.

Next time we'll look at how to fill those pots with different paints – or, if you want to be formal, assign non-default actual colours to the logical colours.

We'll also look at some of the modes other than Mode 5.

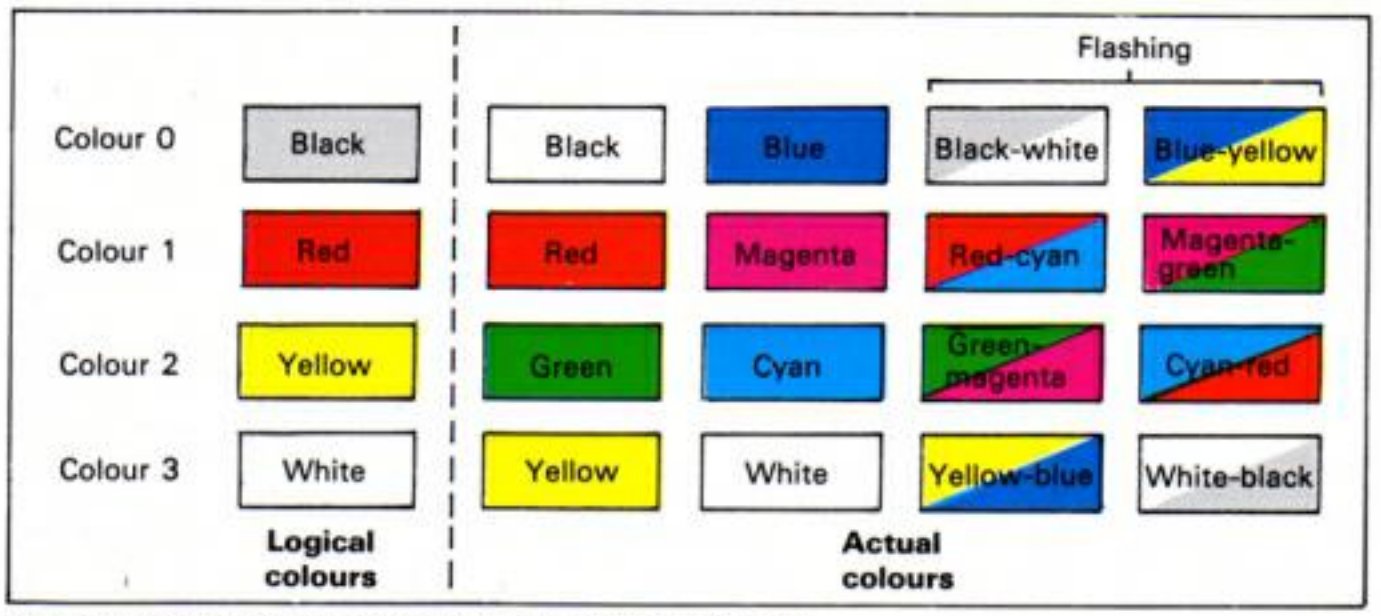


Figure II: Mode 5, its default colours and the ones it could use

Micro Messages

I CANNOT get double height characters on my Electron.

I know that for the BBC Micro you only have to type in PRINT CHR$ (141) "Hello" and you get double height straight away.

So I would like to know how it is done in the easiest possible way. – **Girbinder Singh, Nottingham.**

● Below is a program that will print double height characters in any mode.

Set the colour with COLOUR and the position with TAB.

```
10MODE 7
20PRINT
30PROCbig("Electron User
")
40GOTO 40
50END
60DEF PROCbig(string$)
70LOCAL I%,A%
80FOR I%=1 TO LEN string
$
90%70=ASC(MID$(string$,
I%,1))
100A%=10:X%=&70:Y%=0:CALL
&FFF1
110FOR J%=0 TO 1
120VDU 23,225
130FOR K%=2 TO 9
140VDU ?(&70+4*J%+K%DIV2)
150NEXT
160VDU 225,10,8
170NEXT
180VDU 11,11,9
190NEXT
200ENDPROC
```

Connecting joysticks

I HAVE an Electron and several MicroPower programs, Gorilla, Bandits at 3 o'clock, Croaker.

I wish to connect joysticks, but would also like to use the Plus 1 interface for printer and ROMs.

Is this compatible or will I have to buy a Plus 1 and also another joystick interface such as the First Byte one? Maybe there is another printer/joystick interface that is more suitable? – **A.D. Butcher, Romsey.**

● The Plus 1 is all that you require. Any analogue joysticks can be used with this.

Joyplus in the April 1985 issue of *Electron User* will convert nearly all of the early Micro Power games to work with the Plus 1 and analogue joysticks.

Cartridges for Plus 1

LAST summer I bought a Plus 1 unit for my Electron. At the same time I bought a pair of joysticks and the Hopper ROM cartridge.

I am still very pleased with my Plus 1 but the only problem is that other than Snapper and Countdown to Doom, I have not seen any other cartridges suitable for the Plus 1.

Is this because there aren't any or am I missing out on something?

If so could you please inform me what is available. – **Stuart Robinson, London.**

● There are quite a few ROM cartridges available for the Electron.

Acornsoft have produced Lisp, Logo, Pascal, View and Viewsheet.

ACP's ROM adaptors can be used to plug ROMs into the Plus 1 cartridge sockets. This means that you can make up your own ROM cartridges.

Micro magic

HAVING read yet another article about David Hambly and micro magic, I feel moved to correct your statements.

As far as I am aware I was using a BBC B in my close-up magic act in 1983. This led to my programming the Paul Daniels Magic Show for Acornsoft, which has been on the market since last January for both BBC and Electron.

It contains 10 magical (rather than mathematics dressed up as magic) tricks. One even fooled Paul Daniels himself!

The pack is difficult to find, owing to Acornsoft's unerring way of advertising a product before Christmas but releasing it after the event. But I believe it's by far the best pack on the market, being programmed by a skilled programmer (I wrote most of the Acornsoft adventures) who is also a semi-professional magician.

Incidentally, I note that my Philosopher's Quest is No. 2 in your Top Ten adventures, for which many thanks. Acornsoft never told the public of the Electron versions, alas, also in true Acornsoft style. – **Peter D. Killworth, Oxford.**

View printer driver

IN the December issue of Electron User *you asked whether anyone had used a View printer driver with the Electron. I have been using one for a while.*

My setup is Electron, Plus 1, Plus 3, View and Epson LX-80 printer. I have sometimes used an FX-80 printer.

The printer driver from Watford for the FX-80 printer and BBC computer works perfectly well with the Electron, although it is a bit awkward at the start.

The printer driver I am using just now is one for the MX-80 and works perfectly.

If you can, get a tape version of the printer driver, otherwise you will have to know someone with a BBC running View to transfer your driver to tape. – **David Climie, Glasgow.**

Plus 3 software

PLEASE would someone tell me how I can get my hands on some decent software for the Plus 3? I have just bought a Plus 3 but I can't find anyone that sells Electron software on disc.

Is this because software houses can't be bothered to transfer their programs to disc or isn't it possible?

*Also Robert Sloan (December Micro Messages) doesn't need to use *JOY on Ghouls. Just use the built in joystick option when the first part has loaded.* – **Andrew Dix, Ipswich.**

● Don't throw your tape software away. Sloggers T2P3 ROM will transfer most of your tape software to Plus 3 disc – protecting it at the same time.

As the number of Electron users with discs increases, so will the amount of software on disc.

Way out of the galaxy

WE have an Electron with Elite on cassette.

Despite having our 100,000 credits and an intergalactic hyperdrive, it is not possible to progress beyond Galaxy I following the instructions provided.

Could you please offer any

→

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suggestions of how we may progress onto other galaxies? – **Mike Fleadrian, Gloucester.**

● Your problem arises from the fact that early versions of Elite have a bug.

If you look at Micro Messages for June 1985 in the *Electron User* you will find a way around this.

It also might be worth contacting Acornsoft to see if they will replace your copy.

Way into the dock

I'M having problems with Elite – I just can't dock.

It takes me half an hour to get the entrance port on the screen and then another quarter of an hour to get it any where near the proper position to dock! Can anyone help?

I am a first time adventurer. Can anyone recommend a reasonably priced, descriptive adventure game with a good vocabulary. My favourite games are Repton, Elite and Hopper. – **Ian Wright, aged 9, Chester.**

● You should find Sphinx Adventure is what you are looking for.

Our sister magazine *The Micro User,* featured an Elite player's guide in its January edition that should answer all your problems.

All the facts on *FX

*IS there any way I can find out comprehensive information about the *FX codes, as the User Guide only glances over them? I am sure this is only the tip of the iceberg. For example *FX200,2 clears memory when Break is pressed.* – **F. Lawler, Radlett.**

● The Electron Advanced User Guide provides a list of all the available *FX calls.

John Woollard's series on *FX calls covers them in more detail. This started in the July 1985 issue.

WHAT would you like to see in future issues of Electron User?

What tips have you picked up that could help other readers?

Now's here is your opportunity to share your experiences.

Remember that these are the pages that you write yourselves. So tear yourself away from your Electron keyboard and drop us a line. And please, if you want a reply, enclose an SAE. The address is:

Micro Messages
Electron User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY.

Show generosity

I BOUGHT a switched joystick and interface at the Electron & BBC Micro Show from Vulcan Electronics.

I then went around looking at various exhibits, but after I left and was walking back towards the Underground I noticed that I was only carrying one bag when I should have had two.

I ran back to the hall and went around asking the various officials if anyone had handed in a bag. None knew of anything being handed in. I then went back to the Vulcan stand to see if anyone had handed the bag into them as it had their logo on the side.

They said it hadn't been handed in but the guy on the stand said that he would take the loss as theirs and handed me another joystick and interface.

So I am writing to say a public thank you to Vulcan Electronics, as I am very grateful for their generous action.

Also I would like to say thank you to Database for organising such a show where I could buy cut price hardware and software for my Electron.

I prefer the longer programs in the Electron User *as they are well worth typing in.* – **P. Johnson, Whitstable.**

● Thanks for the praise, and well done Vulcan. We've always believed our shows to be the most user friendly, and your experience proves it.

Our next show is at the New Horticultural Hall, Westminster, May 8 to 11.

Plus 3 and discs

I AM buying a Plus 3 expansion unit and I read in your magazine that the Plus-3 has an 80 track disc drive. But there are 40 and 80 track 3.5in blank discs.

Will the Plus 3 use both types of blank discs, when formatted?

If not, will it take Hewlett Packard 3.5in single or double sided blank discs, when formatted? – **Jamieson Kirkhope, Wokingham.**

● The Plus 3 will format the disc 80 tracks, single sided using its own formatter.

It will not be able to read discs that have a different format to the ADFS, unfortunately.

Basic modes

I HAVE found a way of putting the Acorn Electron Basic sign into different modes.

All you have to do to put it into Mode 0 is type in:

```
*FX 255,107
```

then press Break. To put it into Mode 1 type in:

```
*FX 255,108
```

then press Break, and so on. – **Darren Butler, age 13, Brentwood.**

Software for handicapped

WE have recently obtained a grant to produce computer software for mentally handicapped people which will be the subject of a three-year project at the University of Keele.

We have just finished our first two pieces of software including the first ever computer arcade game aimed at mentally handicapped people, Mr Ugh.

We would be very interested to hear from anyone who has a similar interest or who would like to receive a copy of our free bulletin which is produced at regular intervals. – **Rob Collins and John Hegarty, University of Keele, Keele, Staffordshire ST5 5GB.**

Best buys in disc drives

THANK you for producing such excellent games. During the last couple of months they have picked up tremendously.

Games like Dungeon Quest, Skramble, Tex 'N' Dan and most of all a superb martial arts called Karate Warrior – great stuff, please keep it up.

Please include more music programs as I like music on the Electron, especially short easy to write out programs.

I am thinking of getting a Cumana disc drive. Could you please tell me if the disc interface comes with the drive itself – **Nick Southgate, Upminster.**

● You'll have to buy a separate interface when you get a Cumana disc drive. Unfortunately they don't come in a single package as standard.

Make sure the drive has its own power supply as it can't be run off the Electron's supply.

As for music programs, watch out for future issues.

Colour galore

AFTER having read thoroughly my copy of Electron User *I have seen in Micro Messages a young gentleman asking*

how to get more than his quota of colour.

Although your short program gave a reasonable demo of "more colour", please give my program a try:

```
10C=4:MODE 2
20REPEAT
30GCOL C,1
40C=C+1
50MOVE 0,0
60MOVE 0,1024
70PLOT 85,640,512
80PLOT 85,1280,1024
90PLOT 85,1280,0
100MOVE 640,512
110PLOT 85,0,0
120UNTIL FALSE
```

This may prove addictive viewing, as it does for my two small sons.

You should leave it running for about five minutes. – **Karl Obrien, Abram, Lancs.**

Move in the right direction

I'M glad to see that Electron User *has moved a little up market. Early issues tended to be a bit "comicy", but recent articles and programs have shown your awareness that us tyros are becoming more discriminating.*

Micro Messages is my favourite section, but I am surprised at the number of youngsters looking for ways to cheat at games.

Perhaps I should declare that I'm pushing 40 with two young children, and I certainly will not allow them to cheat.

After all, there is no sense of achievement unless you actually play the game to a conclusion – even if you don't beat the current high score.

In a recent issue a young lady, namely Helen Williams, bemoaned the lack of Electron software in Gloucester shops.

This seems to come and go. Boots had quite a stock a few weeks ago, as did W.H. Smith.

Smiths seem to have lost interest recently, but there are still some good programs left in Boots.

She also liked typing in programs from the magazine. This is where I get most pleasure from the machine, and in fact have yet to find one that fails to work.

This brings me to another point. There seems to be a lack of perseverance from some of your readers.

Complaints that programs do not work are in every case the result of insufficient care taken at the typing stage.

Come on out there, think about what your doing and read the User Guide – it's there to help! – **John Jamieson, Abbeydale, Gloucester.**

Where's Frak?

I WAS wondering if there is an Electron version of Ardvaark's Frak. I have been to all of the good computer stores but half of them have never heard of the game.

So please could you put me out of my misery and tell me if there is one? – **Derek Irving, 12, Glasgow.**

PS. Manic Mole is the best game that's ever been printed in a magazine. Keep up the good work!

● The day we received your letter we learnt of Frak's Electron debut!

Choice of ROM box

I OWN an Electron with Plus 1 and Plus 3. I am now considering buying a ROM box.

However I do not think I will ever need all the ROM sockets offered by the Slogger ROMbox. I was therefore thinking of buying the Advancer ROM Adaptor offered by ACP.

Will the ROM software offered by Slogger work with this product? – **Stuart Murdoch, Edinburgh.**

● ACP's ROM adaptor provides a single ROM socket. Any ROM can be plugged into the adaptor, then plugged into the Plus 1.

All Electron ROMs work in either Slogger's ROMBox or ACP's adaptor.

See Micro Messages, January 1986, for a list of ROMs that work on the Electron.

Transferring software

AFTER reading your review of the Cumana Disc Interface I rushed out and bought it, and I can thoroughly recommend it.

It makes such a difference saving and loading at such speed.

However, there is one question I'd like to ask you. Where can I obtain disc versions of commercial software, or how do I transfer my cassette originals to disc?

I know you are going to give us the never-ending statements about copyright, but surely if someone has a cassette original they should be allowed to transfer it to disc? – **Terry Newman, Norwich.**

● As yet there is very little software on disc for the Electron. However, Slogger has a ROM which will transfer your software on tape to Cumana disc for you.

Non-starter

COULD you please tell me if it would be possible to use the motor racing game Revs on the Electron using the new Tube interface and a second processor?

If so could I use other BBC games on the Electron?

My final question is are there any alien items in Elite and if so which galaxy are they in? – **David Ramsden, 13, Dewsbury.**

● Revs is not available for the Electron and the BBC version will not work even with a second processor attached.

We don't think there are any alien items in the Electron version of Elite. Has anyone found any?

Quality games

WHO are these people who keep trying to tell us the Electron is dying? I would like to get my hands on them and shake the truth into them.

The people who say that software is of poor quality ought to look at games such as Magic Mushrooms, Repton I or II, Deathstar, Beach Head, Guardian, Zalaga, Mineshaft, Tempest, Hampstead and Terrormolinos to name but a few.

Also in regard to Dare Devil Denis and S. Whigham's letter in the December issue, it is possible to get past the policeman and the tree although it is very difficult.

I have only managed it once. To do so ride up to the policeman and jump between him and the tree. Split second timing is required.

It is good to see that the add-ons range has increased with new support coming from ACP as well as increased support from Pace who have brought us that marvellous comms package. – **D.P. Cumbers, St Ives, Cambs.**

Killer stick

I TOOK advantage of your Beach Head offer in October's issue and the game has certainly lived up to my expectations – superb graphics, stunning sound and very hard to beat.

However, I have knocked out the fortress of Kuhn-Lin several times, making a best score of 109,600.

I can also recommend Tarzan Boy by Alligata. I can almost get on to the third screen but I keep getting killed by the walking stick type object that moves up and down the right hand side of the screen. Has anyone got past it? – **Steven Talbott, Swavesey, Cambs.**

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★ ***Bulletin Boards:*** *News, views, software and specialist help – they're all available on the scores of home-brewed electronic notice boards that are springing up all over the country.*

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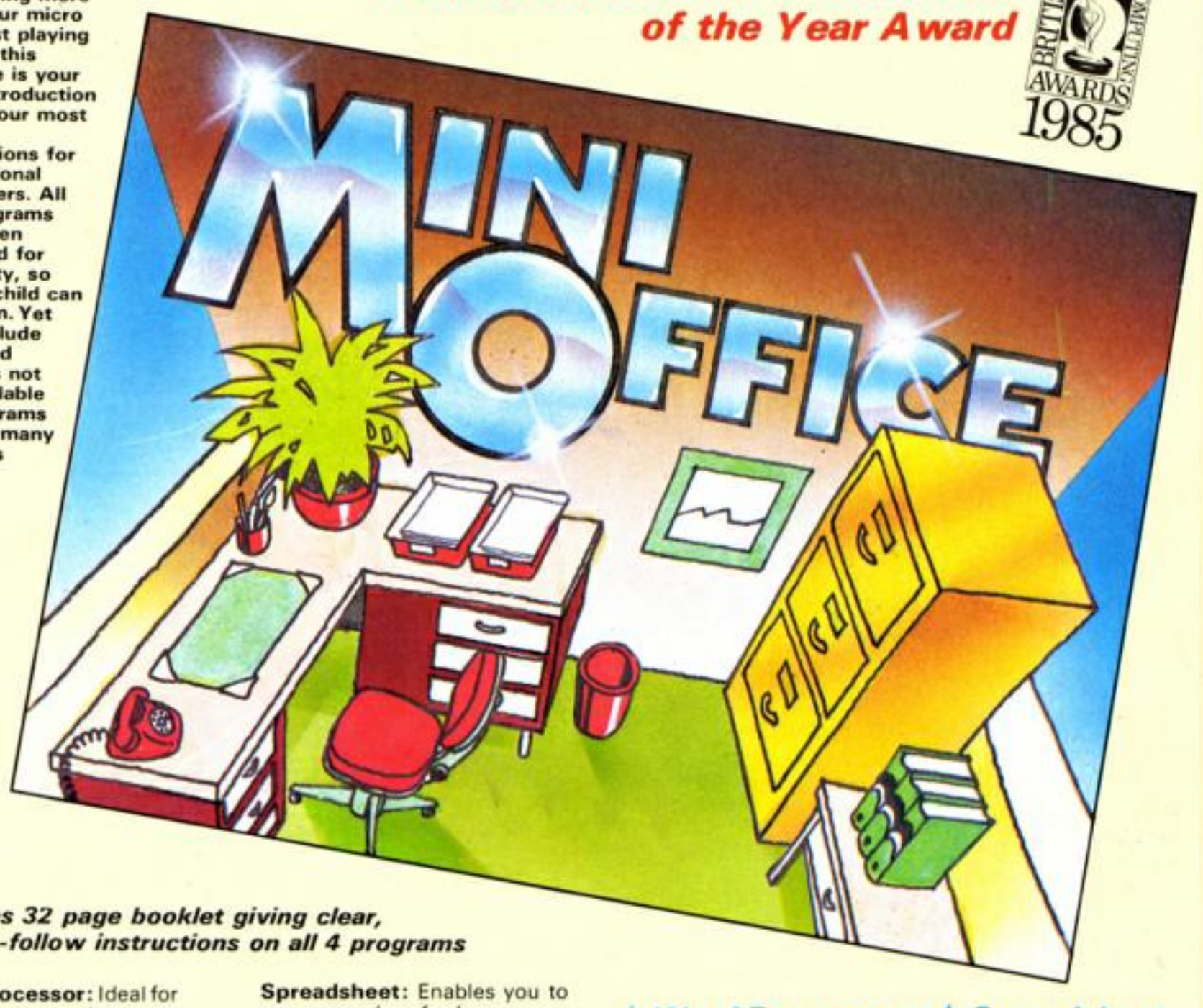

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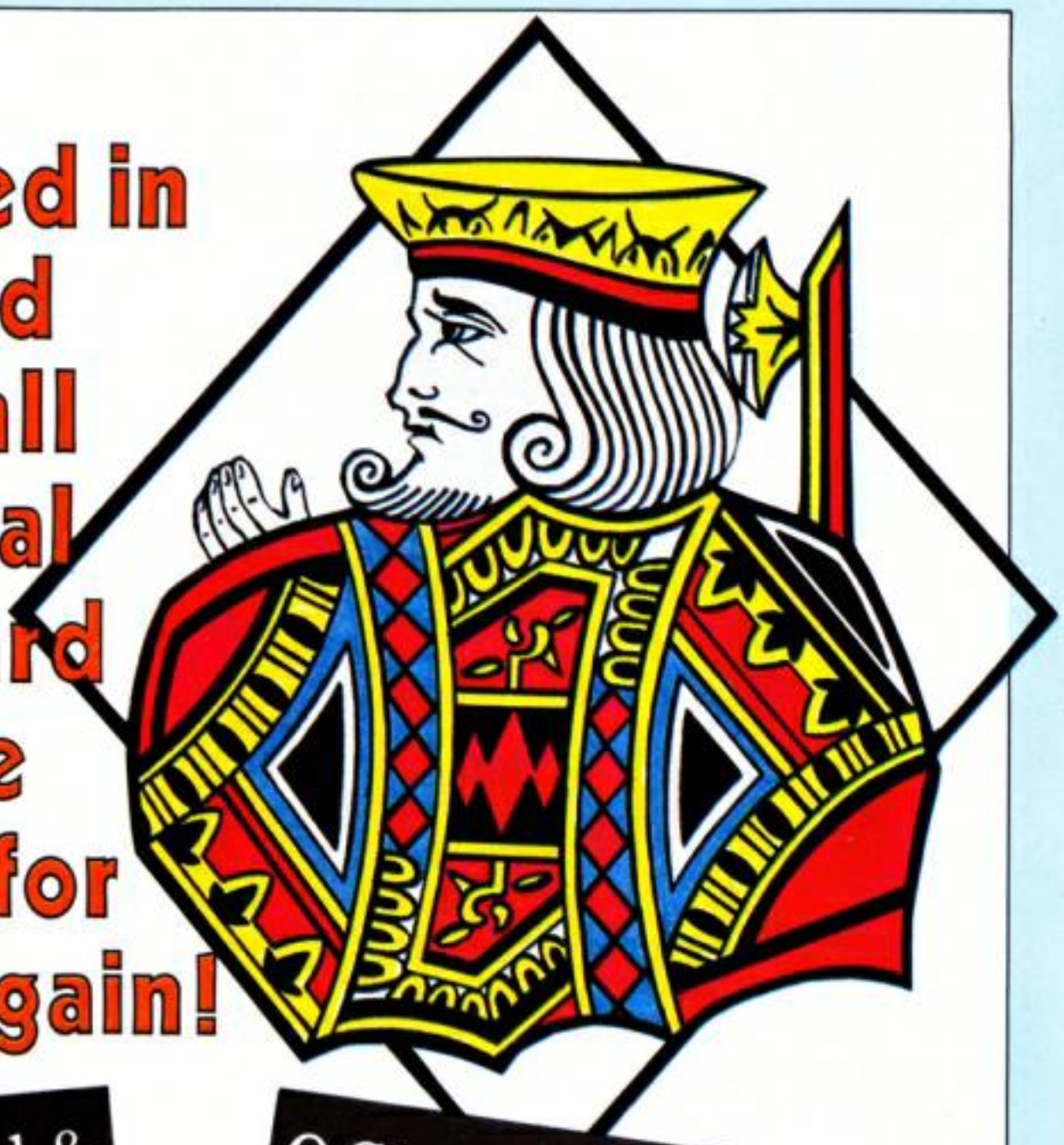

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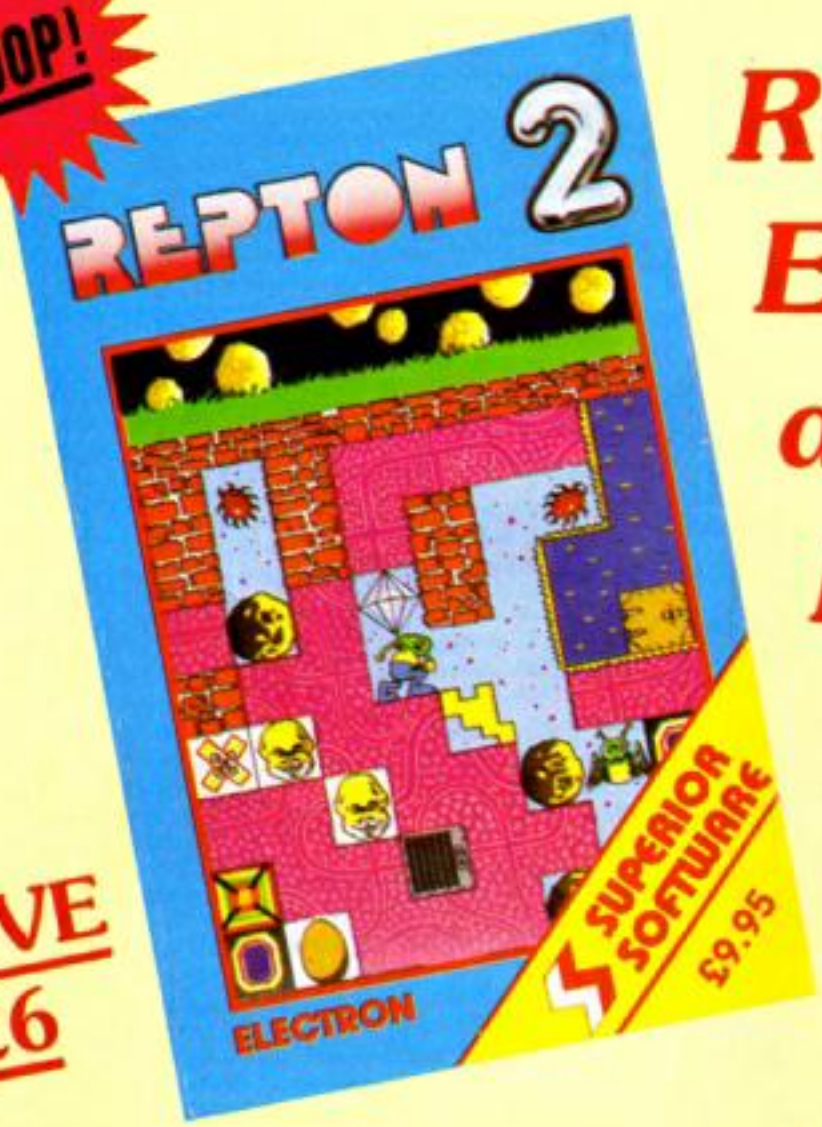

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